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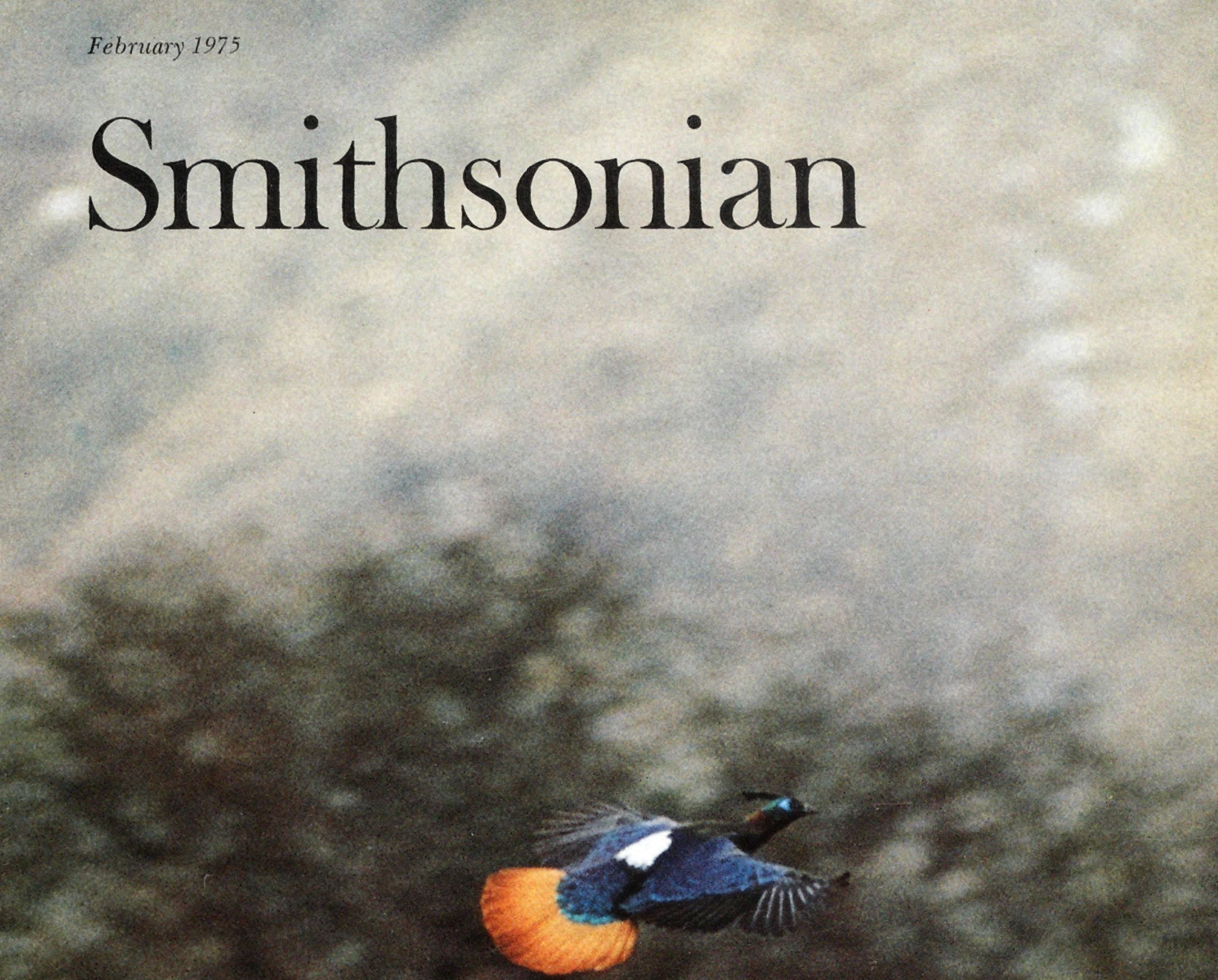
Smithsonian



Nepal (p.58): rare photograph of national bird, the Himalayan monal pheasant, in flight

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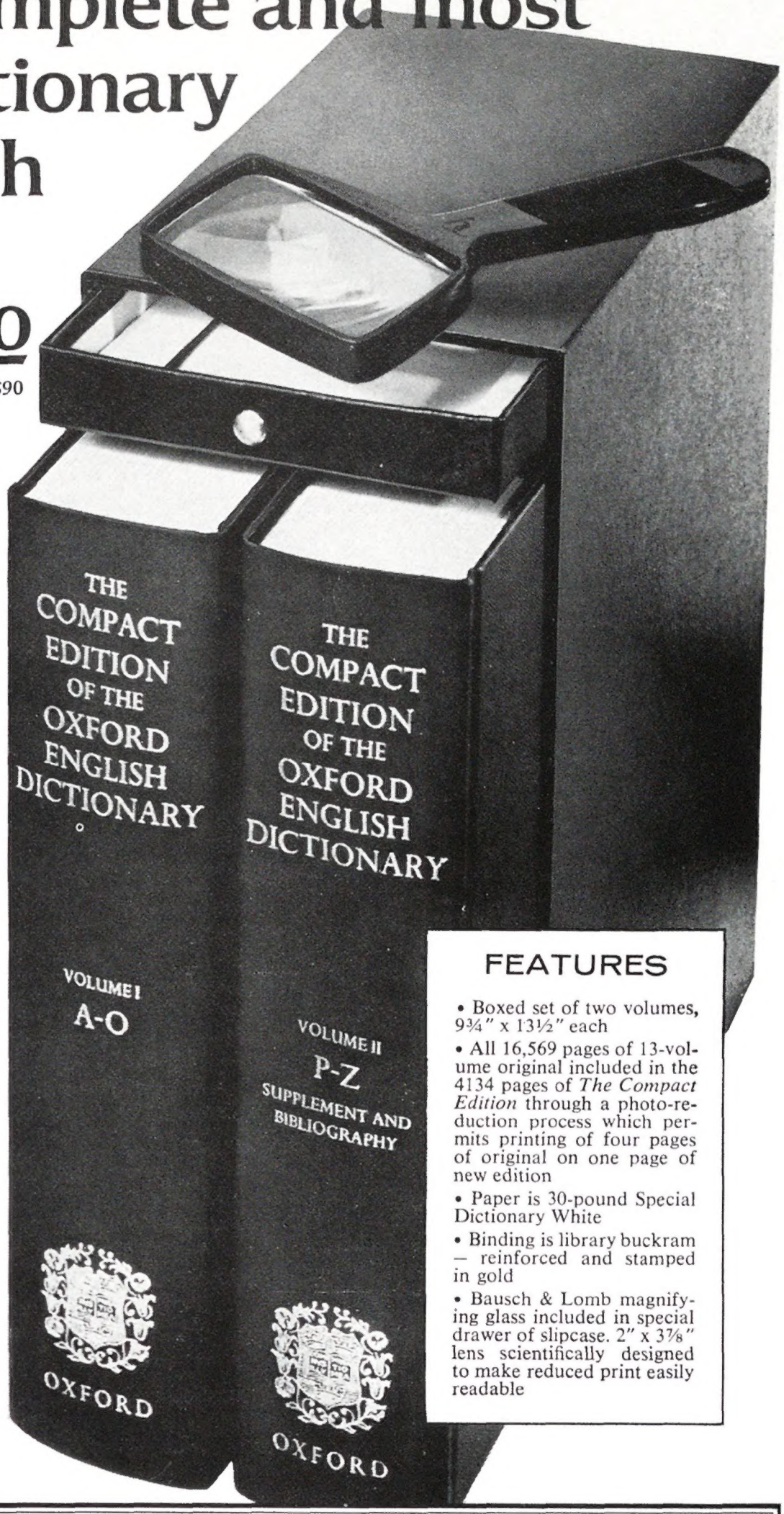

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Smithsonian

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The view from the castle

Environmentalists call for an end to dealing in live animals, but we must keep a place for zoos and their animal-breeding facilities

On last November 18, the following appeared in the *New York Times:* "The Central Park Zoo was not a peaceable kingdom yesterday, but it was mainly members of the human species who were roaring, screaming and snapping at one another." The commotion was a protest meeting of citizens demanding the closing of New York's two municipal zoos and the phasing out of the New York Zoological Society's Bronx Zoo.

A week or so later I addressed the centennial dinner of the Philadelphia Zoological Society, and predicted hard days ahead for all zoos. The environmental movement is now firmly implanted in people's minds, together with the animal-welfare movement. The Department of the Interior, galvanized by the public's horror at the excesses of furriers and pelt dealers, has now started to attack dealers in living animals. This bids fair to end all trade in animals and may well put an end to zoos (See SMITHSONIAN, May 1974).

There are those, including myself, who feel that sounding the knell of indiscriminate dealing in animals, including pets and domesticated stock, is wholly appropriate. But people seem to be deaf to what game biologists and ecologists are saying: that man is himself the prime disturber of the environment, and the original predator-prey balance has been irretrievably lost. Regulations, cumbersome and tedious as they are, must be flexibly interpreted—often on an *ad hoc* basis—if the necessary interplay between animal and human populations is to be maintained.

Many people now question whether zoos are needed anymore. I think so, most vehemently. Zoos and their wholly necessary corollary, zoo breeding parks, are the last chance that we will have of seeing a number of animals in the future. The various wildlife trusts abroad have shown how threatened species can be preserved. Woburn Abbey saved Père David's deer as a munificent gesture. Peter Scott's Wildlife Trust helped to save the Hawaiian goose as an act of conservation philanthropy. The Jersey Wildlife Preservation Trust attempts to save a plethora of animal species.

Some management of breeding animal stocks may be the *only* way of saving various endangered species. In another 50 years most of the large terrestrial wild species will be gone, except for a few preserved by rational captive management. So captive breeding becomes an imperative.

The educational, scientific and genetic potential of those animals that will survive is wholly in our own hands. It is a responsibility that far transcends public emotion or government regulation. Let me cite one example. The California condor (SMITHSONIAN, March 1972), last of the great Pleistocene raptors of North America, is slowly dying out in its dwindling range near the California coast. It will be gone before this century is out. There is one in captivity—in the Los Angeles Zoo. But condors can be bred in captivity by skilled aviculturists. We are confronted with a simple choice. Should the last of these noble birds fly off into one of those breathless sunsets over the Pacific, taking with it the riddle of its genetic heritage and closing the book on the species, or could a stock be bred against a day when we may have learned to cherish our responsibilities toward our fellow travelers in the ark?

S. Dillon Ripley

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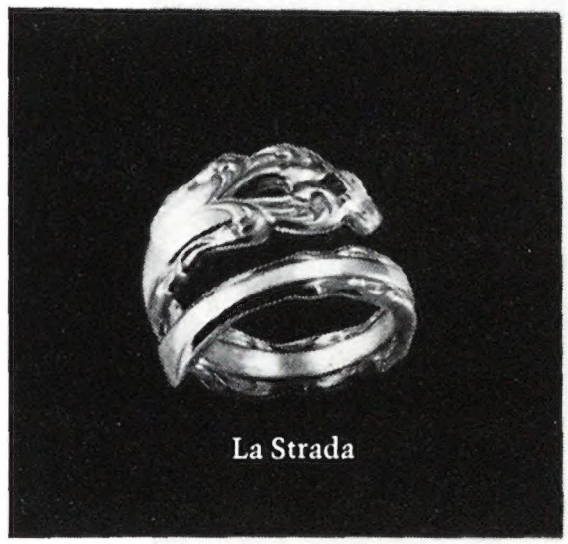

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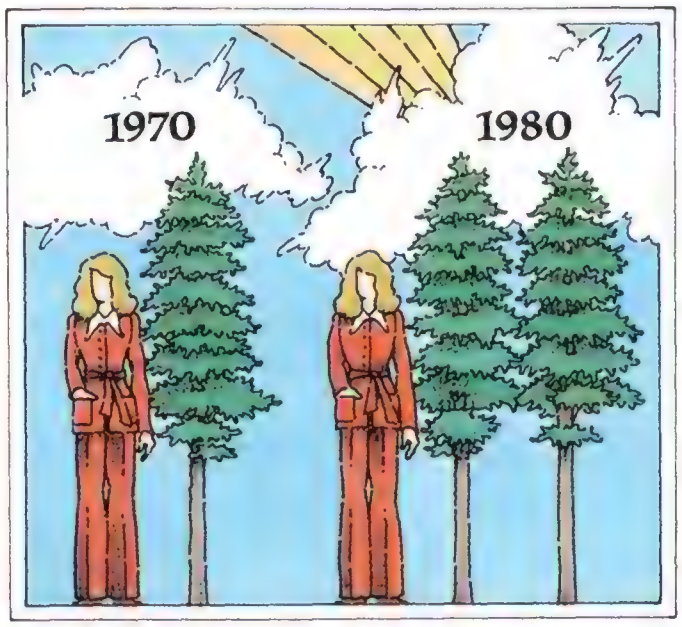

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Letters to the Editor

Energy

Dear Sir: Wilson Clark's article in the December issue, "It takes energy to get energy . . . ," vindicates my long-held views that much of today's costs should be measured not in dollar costs, but in energy costs.

From the great engineers to the simple builders, we just don't know how to build to live with our environment. We still build high-rises and then pump an environment into them that is a constant drain of our energy.

A short time ago, a ship came into San Francisco Bay and unloaded German-made automobiles. Then it took on a load of American-made cars bound for Japan. Undoubtedly, it then took on a load of Japanese cars to deliver in Europe. The ship is probably still at sea wasting energy. This raises the question with me: When are we going to realize the "Good Times are Over," and cut out the waste?

Robert J. Hannah
Oakland, California

Dear Sir: Wilson Clark's article is provocative and important. In fact, I wish he had explored further some of the implications of reduced energy resources.

He writes of the world's inanimate natural resources that are being consumed at an alarming rate for purposes of energy. However, he makes little reference to the energy resources provided by domesticated animals and human beings. These exert an influence on our philosophical, social and theological concepts.

William K. Selden
Princeton, New Jersey

Dear Sir: The article on energy is most absorbing and in tune with my own thoughts. But I wish the author had clarified this sentence: "However, the net energy yield from solar power overall might be low, requiring much energy to build elaborate concentrators and heat storage devices necessary." In my opinion, this statement is true as far as it goes. What I wish had been added is: The building of the necessary equipment to collect and store the solar energy is a *one-time* cost, not a continuing cost as is true in making all other forms of energy available.

The time will come, I believe, when every man who has a roof over his head upon which the sun shines will realize that he has, for the simple, inexpensive taking, a very substantial amount of energy that is free, clean, non-polluting and inexhaustible.

Harold S. Bates
Hudson, New York

Henry Ford's Peace Ship

Dear Sir: J. Timberlake Gibson's article, "Henry Ford's peace ship . . . ," provided an interesting glimpse of that bygone era. His conclusion concerning Mme. Rosika Schwimmer is simply that she "received her smidgen of immortality" by seeing her ideals as contributing to the Central Powers' surrender in World War I.

There is much more to the life of Rosika Schwimmer. Later on she came to this country and applied for citizenship. As a woman in her fifties, and a pacifist, she stated on her application that she would not bear arms to defend the United States. In her battle for citizenship, she carried her case all the way to the Supreme Court, where she lost. Justice Holmes wrote in his dissent: "[There are those who] believe more than some of us do in the teachings of the Sermon on the Mount." It was not until after World War II that pacifists were admitted to citizenship. Nevertheless, her "smidgen of immortality" is perhaps better recorded in her case, *United States v. Schwimmer*, 279 U.S. 644 (1927).

C. J. Randolph
Associate professor of Political Science
Millersville State College (Pennsylvania)

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The elaborate costumes for this important ceremonial are fashioned after drawings of the Gans which they left in and around mountain caves as reminders to the Indians of the time when the Gans walked among men.

***The Eagle Dance,** as performed in the Pueblo of Tesuque (tes-oo-kay), is easily one of the most beautiful and intricate of all Native American sacred dances.*
The eagle's power is invoked in an energetic, swooping, diving dance that requires almost superhuman agility and strength of the young men chosen to perform it.

***Mikael Redman,** whose miniature sculptures have gained international recognition, is among the Southwest's most widely collected artists. Born in the Indian country of northern Arizona, his fascination with the Original Americans began early in life and gives his art uncommon depth and authority.*
In a medium intolerant of mediocrity, Redman is among the few of the world's sculptors who possess the patience and technical skill required for its successful execution; up to 600 hours of painstaking work are required for the creation of each sculpture. Other examples of Redman's work may be seen in his gallery at 7110 Fifth Avenue, Scottsdale, Arizona.

***"The Eagle Dancer" and "The Gan Dancer"** are the first and second in a series of eight Southwestern Indian figures by Mikael Redman. There are 885 sculptures in each edition available for sale, with an additional 15 in each edition reserved for museum usage. The figures are .999 fine silver, accented with 24 carat gold plate, rhodium clad to prevent tarnishing and mounted on an uncut turquoise base of at least 250 carats. They are presented in suede-lined, oiled walnut cases which may also be hung as shadow boxes.*
"The Eagle Dancer" $265
"The Gan Dancer" $330
Each sculpture is individually numbered and signed.
Purchasers of these two sculptures will have the opportunity to reserve the same edition number on subsequent works in the series. Signed, numbered editions of twelve are also offered in four hues of solid 18-carat gold, priced at $3200 for the Eagle Dancer and $3800 for the Gan Dancer.
For whatever reason one acquires a work of art: beautification of one's surroundings, the enrichment and preservation of history, or its value as an investment, beautiful miniatures of this quality will have an important niche in any collection.

***These original sculptures** may be ordered only through The Mikael Redman Galleries, 7110 Fifth Avenue, Scottsdale, Arizona, 85251, attention: Mr. Bell. American Express, BankAmericard or Master Charge cardholders may expedite shipment of their purchase by calling Mr. Bell, toll free, at 1-800-528-7865, extension 2200.*

The Mikael Redman Galleries
Scottsdale, Arizona

The most scathing contemporary judgment on the behavior of the press was delivered by one of them—George Fort Milton, editor and publisher of *The Chattanooga News,* whose reports from the Ford expedition were published in that newspaper in February 1916. He wrote: "I must say that of all the exhibitions of mendacity in newspaper correspondents the most shameless were given on this trip. . . . They became offended at incidents on the trip over; then kept off to themselves and manufactured their news stories out of rumor and inconsequential incidents. . . . There were many honorable exceptions but most of the eastern papers were represented by correspondents who disgraced journalism. The press associations fortunately were in better hands. . . ."

None of us ever saw Rosika Schwimmer "simulate a demure hausfrau," but the most defamatory statement in the article was the comparison of this pacifist with Lizzie Borden.

Edith Wynner
Consultant to the Schwimmer-Lloyd Collection of the New York Public Library

Dear Sir: The reporters aboard the peace ship *Oscar II* thought it hilarious that a prominent figure should become involved in promoting the idea that man might rise above war and debilitating drugs.

It must be remembered that Mr. Ford had already done a number of things that would have been considered impossible had he required a national consensus. These successes were no doubt due in part to the fact that he had no "wiser heads" around to tell him it couldn't be done.

John J. Runnings
Seattle, Washington

Haboobs

Dear Sir: As a former resident of Tucson, I was amazed to find a new word describing dust storms—haboob. The timing, too, seems to have changed. When we arrived there in the early Fifties, we were told the date to expect the summer rains was July 19. We observed that they occurred mostly about four days earlier. But we left before Author Sherwood B. Idso arrived and, like everything else, the Arizona weather must have changed, too.

Ann Weiss
Berkeley, California

According to R. S. Ingram, chief meteor-

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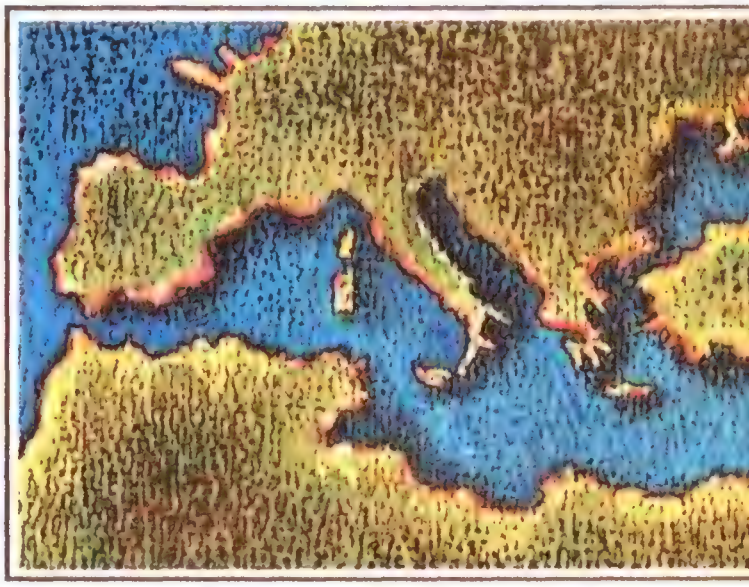
Our ships are expressly designed to pamper approximately half as many guests as could normally be accommodated within their length. You'll find them not only incredibly spacious, but serviced by a crew trained to anticipate your every wish.



In fact, ask yourself what it would be like to have a sumptuous private yacht able to take you to any pleasure in the entire Mediterranean. And come prepared to find the answer.

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The computer watch of the future is here now! JS&A proudly introduces the One Button Digital—the first light-sensing, one button control, solid-state L.E.D. watch.

Solid-state L.E.D. digital watches are great fun. With the older crop of watches, you'd press one button and get the hours and minutes, you'd press another button and get the seconds, and you'd press either a third button or a combination of buttons and get the date.

But with all its space-age appeal, the solid state L.E.D. watch had its disadvantages: 1) too many buttons to press and 2) too difficult to read in bright light. JS&A's One Button Digital has changed all that.

Now you can press a button once and get the hours and minutes. Keep the same button depressed, and the seconds appear. Press the same button twice, and the month and date appear. In short, you control all functions of your watch from one central button.

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Built into each watch is a light-sensor that measures the exact amount of available light and then controls the intensity of the light-emitting diode (L.E.D.) display. In a bright room the display will brighten; in a dark room the display will dim. This extra feature makes the One Button Digital the easiest watch to read under almost any lighting conditions. It is also a battery-saving feature since the light sensor limits the brightness of the display in low-light conditions and consequently reduces the amount of power needed to illuminate the display. With average usage, the batteries should last over one full year without replacement, and batteries are commercially available at any jewelry store.

BUT THERE'S MUCH MORE

You set your watch by inserting any ball point pen into a special recessed switch. Setting the exact time and date takes a matter of seconds, and no special tool is required. The watch is programmed to remember the days in each month so that once the date is set, there's no need to change it at the end of each month.

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JS&A's new solid-state digital watch is the newest of the space-age quartz computer timepieces. Quartz oscillates at a precise 32,768 oscillations per second. In the One Button Digital, one micro-integrated circuit containing over 1,000 tiny transistors translates the precise quartz crystal oscillations into an equally precise digital readout of time. The One Button Digital has an accuracy range of better than one minute per year and has no moving parts to lubricate, wear out, or adjust. It's literally trouble-free and comes with a three year parts and labor warranty backed by our national service-by-mail facility.

American watch technology has reached a milestone with the introduction of our One Button Digital. Now, in one handsomely-styled, elegant piece of jewelry, you have the latest solid-state, space-age achievement at a price you can afford.

Keep the button depressed and the One Button Digital automatically switches from hours and minutes to display the seconds. Press the button twice and the month and day are displayed.

You may even charge your watch to your American Express, Diners Club, BankAmericard, or Master Charge credit card account by calling our toll-free number below, or you can send us your check for $152.45 ($149.95 plus $2.50 postage and handling—Illinois residents add 5% sales tax), and your watch will be sent by return mail. Please specify if you wish the gold-plated or rhodium case.

The One Button Digital makes setting the exact time as easy as inserting a ball point pen into the recessed switch shown to the left of the button. The very masculine lines also make it the perfect gift for the executive on your list.

JS&A is America's largest single source of electronic calculators and other space-age consumer products. We pride ourselves on the finest service, the most advanced products and the best value. If you are not absolutely convinced that the One Button Digital is the nation's best digital watch value, return it within two weeks for a prompt and courteous refund. You can't loose.

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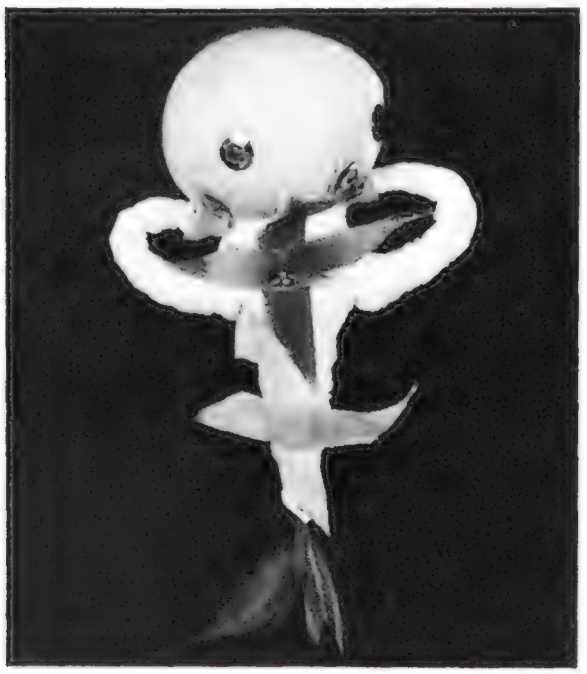
ologist for the National Weather Service in Phoenix, the date in the article was based on an average collected over a 20-year period. But it is true, he said, that although the monsoon for several consecutive seasons came as late as July 19, it also can start as early as June. Ed.

Black studies

Dear Sir: In your article on black studies, you show administrator Cecil Glenn wearing what you describe as a "voodoo doll." It looks more like the limberjack, featured in your folk toy article.

I have an authentic voodoo doll [shown below], made for me by a voodoo priest in Haiti.

Perhaps we need more black studies.
Lloyd Teitsworth
Wilmington, Delaware
Cecil Glenn assures us that his, too, is an authentic voodoo doll. Ed.

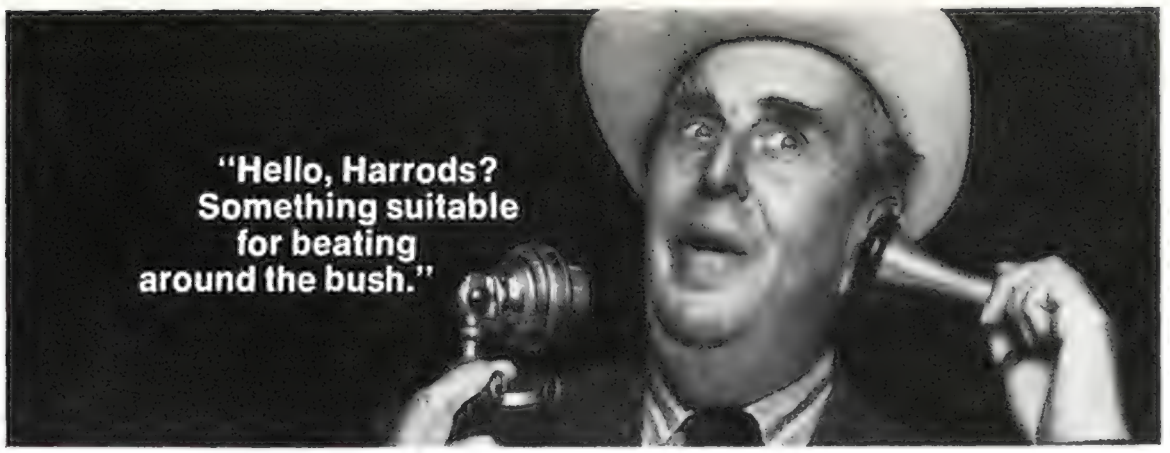


Lloyd Teitsworth's Haitian voodoo doll.

Mistletoe

Dear Sir: At Christmas time, I do *not* "hang up a sprig of mistletoe under the chandelier at home or over the water cooler at the office and imagine simply that this represents an excuse to swipe a quick smooch from [my] wife, sister-in-law, secretary or some other cutie."

Realizing from the above quoted paragraph that your article was for men only, I followed your clear-cut directive and stopped reading right there. This is from another cutie (also wife, sister-in-law and sometime secretary).
Phoebe W. Ellis
Millwood, Virginia



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YORUBA, staff [Nigeria]

The powerful god Shango, fourth king of the Yorubas, is evoked by dancers holding this staff. The kneeling figure represents his wife, Oya. Wood, hgt. approx. 11″. $80.

DOGON, figure [Mali]

In Dogon mythology, the Tellem are revered as ancestors. This Tellem figure, praying for rain, is used to protect the harvested grain. Its distinctive style is characteristic of Mali art. Wood, hgt. approx. 28″. $45 incl. mount.

ASHANTI, doll [Ghana]

Young women wear these dolls, which are said to embody the Ashanti ideal of beauty, in order that their child, too, will be beautiful. The disc-shape head, simplified features and columnar body are traditional. Wood, hgt. approx. 9″. $25 incl. mount.

MARKA, mask [Mali]

The Marka, a sub-tribe of the Bambara, apply fire and metal to give this mask special powers. The lower half of the mask is sheathed in metal. A fine example of the strong Western Sudanese style. Wood and metal, hgt. 16″. $95 .

The noble tribes of Africa offer

Thousands of Africans in the drought-stricken Sahelian zone are dying from starvation, malnutrition and disease. When you purchase even a single piece of African art, you help hundreds to survive — including, perhaps, the artist himself. You may also be making a very interesting investment.

Unlike the art of many ancient cultures, the strength and vitality of African art remains undimished even after 8000 years. The tools and methods used centuries ago are the same ones used today: the object is fashioned by an iron-bladed adz from the soft wood of a young tree; a knife is used to carve the fine details; the surface is smoothed by sand rubbed with leaves; and, a patina is developed with oil and smoke, or simply through frequent handling in ceremonies.

Long before Europeans "discovered" Black Africa — the region south of the Sahara — tribal kingdoms flourished as a close-knit network of villages. The inhabitants were farmers of the rainforests and adjacent savannahs, and as their fundamentally religious art evolved, it fulfilled functional, earthly needs. Rain, fertility, power, good fortune — all of the elements necessary to the survival of these societies — became embodied in their art forms.

Sculptors worked entirely within the unique traditions of their tribal styles and design motifs and were generally anonymous. Thus, the highly functional art of Black America has a remarkable consistency. But while the tools, materials and methods are unchanged, fewer and fewer villages are producing their traditional art. After 8000 years the flame is flickering.

The Killing Drought

Six years ago, the vast Sahara began creeping southward. Mile by mile it overwhelmed the fragile viability of the Sahel — the broad, arid savannah that runs from the Atlantic to the Red Sea — and choked its watering holes with dust. Each year the drought has become more devastating, its impact more irreversible. Cattle have perished by the millions. Children and new mothers — always the chief victims of famine — are dying of starvation, disease, and malnutrition. Hundreds of thousands of Sahelians from Chad, Niger, Nigeria, Mauritania, Upper Volta, Mali, Senegal, as well as Ethiopians, have fled before the oncoming Sahara to already overcrowded cities and refugee centers.

Among the organizations that have responded to pleas for help is CARE, a nonprofit, nonsectarian, private agency for voluntary international aid and development. In its 29 years of existence, CARE has responded to the needs of people in 77 countries on four continents by providing them with $1.5 billion worth of aid.

The Urgent Challenge

"Half of all the world's people suffer chronic hunger or serious dietary deficiency.

"The world has many millions of persons to feed every day to keep them from starvation. But the real need — the urgent challenge — is to increase their ability to help themselves.

"We welcome the Tribal Arts Society program. It helps Africans help themselves by providing a market for their art. It also provides CARE with critically needed funds for direct Sahelian relief and rehabilitation."

— Harold S. Miner,
President, CARE

BOBO, mask [Upper Volta]

The buffalo is the tribal animal of the Bobo. This mask is used in ceremonies at the beginning of the growing season. Its power lies in the eyes which are enhanced by concentric rings. Wood, hgt. approx. 20″. $70.

BAMBARA, headdresses [Mali]

Legend has it that Chi Wara, antelope god of the Bambara, taught man to till the soil. The single male figure and female with baby are paired in dances at planting time. The openwork technique was much admired by Picasso and Modigliani. Wood and raffia, hgt. approx. 36″. $110 each incl. mount. $210 the pair.

SENUFO, mask [Ivory Coast]

Dance mask (kpelihe) used by male initiates during their bush ceremonies. Various tribal guilds, as well as wings and legs, are symbolized. This mask also serves to drive away "soul eaters" or sorcerers. Wood, hgt. approx. 20″. $45.

KURUMBA, figure [Upper Volta]

The graceful antelope god is one of the few subjects of Kurumba sculpture. It is danced in ceremonies during planting season. The same colorful pattern appears on certain masks of the neighboring Bobos. Wood, hgt. approx. 30″. $85 incl. mount.

you their art-to survive.

Relief and Rehabilitation

CARE is now providing all the food and medical supplies it can to starving Sahelians in Chad, Niger, and Nigeria. It is also aiding water development projects. But CARE's resources alone cannot possibly cope with the problem. The threat of famine hangs over millions of Africans as calls for help increase. Emergency relief must continue — but, all possible priority must be given to rehabilitation aid

You can help.

The noble tribes of Africa are offering you their art to help the Sahelians survive. Depending on the piece selected, as much as 30% but not less than 10% of the regular retail price of each object sold will go directly into CARE programs in the Sahel. CARE is rated the most efficient agency of its kind in America. Even your smallest purchase will buy a nutritious meal for 216 children. $2500 builds a safe water system for 1,000 villagers.

An Investment in Life and Art

CARE will acknowledge in writing the exact contribution it received as a result of your purchase and send you a report on how this money was spent. It will make you proud to know that the art you cherish and the donation you made possible helped save lives — including, possibly, the artist's.

Your purchase also insures your election to Charter Membership in the Tribal Arts Society, a new organization which seeks to develop a wider appreciation for authentic native arts. Through its direct and often exclusive arrangements with tribes the world over, the Tribal Arts Society can offer you prime examples of the work of master artists and craftsmen. You will have opportunities to purchase these offerings but never any obligation.

The Prospects of Appreciation

You will be interested to learn that prices for authentic African art have tripled in just five years. Only last October at the world's largest and most famous auction gallery, Sotheby Park Bernet, four Ashanti dolls went for $125 to $425, a Yoruba staff fetched $325, a Bambara headdress brought $1,500, and a Dogon figure was knocked down at $1,700.

TRIBAL ARTS GALLERY TWO
37 West 53rd Street
New York, N.Y. 10019

Gentlemen: Please send me the African tribal art I have selected, accompanied by your signed certificate of authenticity. You will pay CARE between 10% and 30% of the purchase price, which will be acknowledged to me in writing by CARE, and this money will go directly into CARE programs in the African drought zone.

I will also be elected to Charter Membership in the Tribal Arts Society which will guarantee me priority on purchase of future offerings by the Society without any further cost or obligation.

I reserve the right to return my purchase wihin 30 days for full refund and cancel my membership if I am not satisfied.

- ☐ Bambara headdress — male $110
- ☐ Bambara headdress — female $110
- ☐ Bambara headdresses, pair $210
- ☐ Bobo mask $70
- ☐ Senufo mask $45
- ☐ Dogon figure $45
- ☐ Yoruba staff $80
- ☐ Kurumba god $85
- ☐ Ashanti doll $25
- ☐ Marka mask $95

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Phenomena, comment and notes

A new step in human evolution, the inefficiency of male swimmers and getting lit unintentionally

Just about every time you turn your back someone pops up with yet another threat arising from what we are still wont to call progress. Now it's energy pollution. It comes from such things as microwave ovens and high voltage power lines.

According to Louise B. Young and H. Peyton Young, writing in *The Bulletin of the Atomic Scientists*, there are some 1,200 miles of 765,000-volt power lines in the United States and there will be about 10,000 miles of them by 1990. Two-million-volt lines are on the drawing boards. Since they are built by private utilities, as opposed to government agencies, they are not subject to the National Environmental Policy Act and the reason to worry about them is not just a matter of preserving pretty landscapes. The problem is that they create an electric field powerful enough to make a fluorescent light bulb light up by itself even at a considerable distance from the right of way (see photograph, page 20.)

There has been precious little research done in this country to assess the effects of such dosages of juice on the human body, even though a lot of people live under these lines or run tractors near them for many hours a day. The principle of innocent-till-proven-guilty, as applied to technology, deserves rethinking. But in the USSR, studies have shown that prolonged work under 500,000-volt power lines resulted in "shattering the

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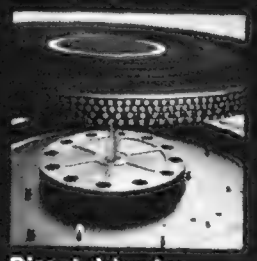
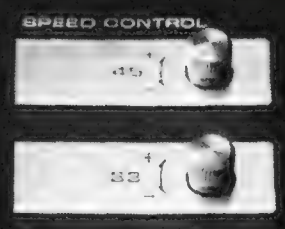


Direct-drive for precision platter rotation.



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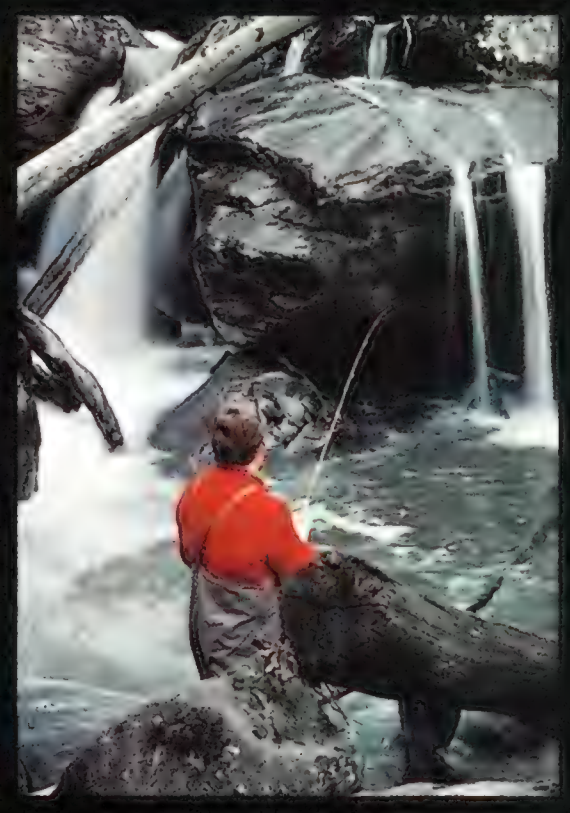

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dynamic state of the central nervous system, heart and blood-vessel system, and in changing blood structure. Young men complained of reduced sexual potency." Accordingly, the Russians have adopted safety standards and protective measures for people working in the vicinity of high voltage lines.

Electric field near this high voltage power line lights up fluorescent bulbs.

In the absence of any such standards in the United States, the authors suggest a rule of thumb: The point at which a light bulb in your hand is turned on is the point at which you are too close.

Facing facts

In 1705, Peter the Great of Russia attempted to impose a tax on beards and almost provoked a rebellion.

Chopin wore a beard on only one side of his face. "It does not matter," he said, "my audience sees only my right side."

A gentleman named Birdwhistell has discovered that there are "high smile areas" in the southern United States while, in western New York State, people smile far less. And around the Great Lakes, "a person smiling with an ease perfectly proper in the South might well find himself challenged to explain what he finds so funny."

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forwardly titled *The Human Face*, it is by a British psychologist, John Liggett, and published by Stein and Day, and it goes a long way toward showing that there is more to the face than meets the bleary eye in the mirror every morning.

For example, tests have shown that a high degree of facial movement gives the impression of masculinity, which may explain why thick paste cosmetics have been popular with women for millennia: By restricting apparent movement, they enhance femininity. But nothing comes free. Sebaceous glands concentrated in the forehead and nose area give off a substance, particularly in adolescence and early adulthood, that is thought to be a sexual attractant, something like the chemical pheromones of insects. Perfumed cosmetics, of course, mask these secretions. So, ladies, take your choice.

Plugging in

The evolutionary process goes on, even among the species that prides itself as the ultimate product—*Homo sapiens*. And the direction of human evolution (now powered largely by technology) is becoming clear: We will all ultimately be mere passive receivers of information, connected to the Great Transmitter from which all entertainment, ideas and insights will flow.

Television helped in this regard, but the transistor radio was a major step in the new direction, permitting even beachcombers to hear the top ten songs and the latest news. The next step has now been taken. Edmund Scientific Company has for sale an almost weightless AM radio (six-tenths of an ounce), so small you can stick it in your ear.

One can imagine the next step after *that*: even tinier, atomic-powered radios implanted in the ears of babies as they are born, with the ear eventually growing around it so that nothing, like the sound of waves, or of traffic, will interfere. . . .

More than we thought

Official estimates of world population growth show that some 75 million people are added to the rolls each year and if you have been worrying about how they will all be fed, there is now cause for even greater worry. The Environmental Fund

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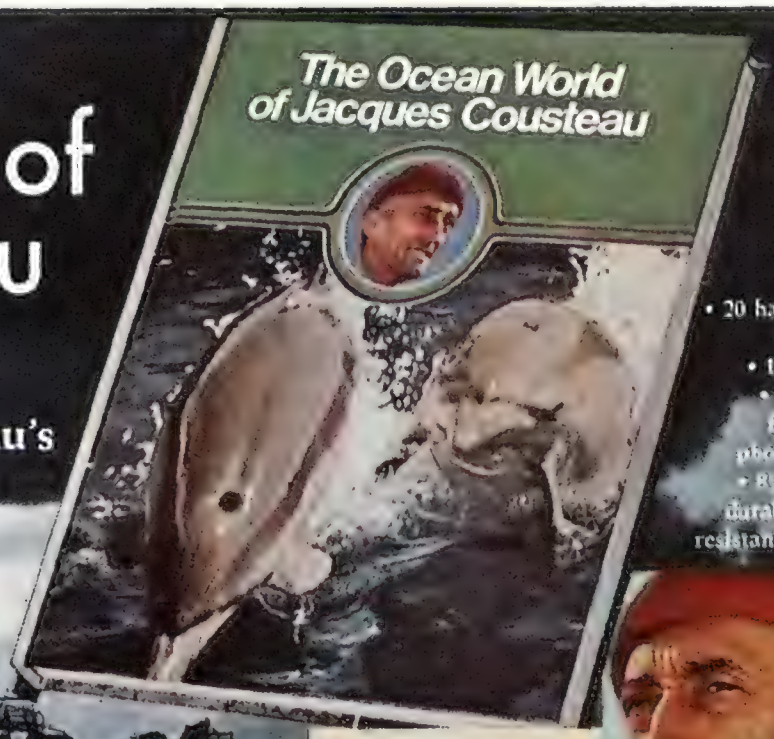

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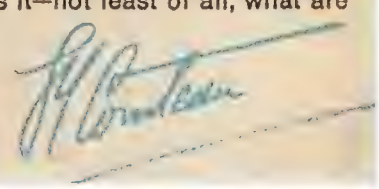

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in Washington, D.C., has recently announced that the world population is growing at 90 million a year, and that we passed the 4 billion mark early last year. At last fall's U.N. population conference, the Chinese, for example, reported 800 million inhabitants, but the researchers at the Environmental Fund, using published growth rate figures, say that the People's Republic more likely has 900-odd million people. At present growth rates, there would be 1,800,000,000 Chinese by the year 2000.

The 1970 U.S. census indicated that there were about 212 million people here, but it is estimated that more than 5 million people weren't counted. Add to that the probable 8 million illegal immigrants, and you have a U.S. population of closer to 225 million. At present rates of growth, our population would take about 70 years to double.

The highest rate of growth of any nation (3.7 percent) is that of Libya, giving its population a doubling time of about 16 years. The lowest growth rates are in West and East Germany, Luxembourg and Malta, all of which are actually losing population.

All in all, the Environmental Fund calculates a worldwide growth rate of 2.2 percent, a doubling time of little more than 30 years. What is important to keep in mind, however, is that growth *rates* are one thing, and actual growth another. Few people doubt that lack of food will cause a sharp and brutal drop in the growth rate before too much time goes by.

Naiveté and prejudice

When confronted with pictures of other monkeys, a monkey raised in naiveté (and in captivity), discriminates between individuals. Shown pictures of pigs, the monkey loses interest and makes no distinction between individuals. This information is the result of research carried on at Cambridge University and reported by *New Scientist*, which goes on to say that once the monkeys have become sophisticated—that is, once they have spent a lot of time looking at pictures of different species of animals—they begin to see the differences between non-monkey individuals. So whenever you hear someone say, of one ethnic group or another, that "they all look alike to me," you are in the presence of someone with an intel-

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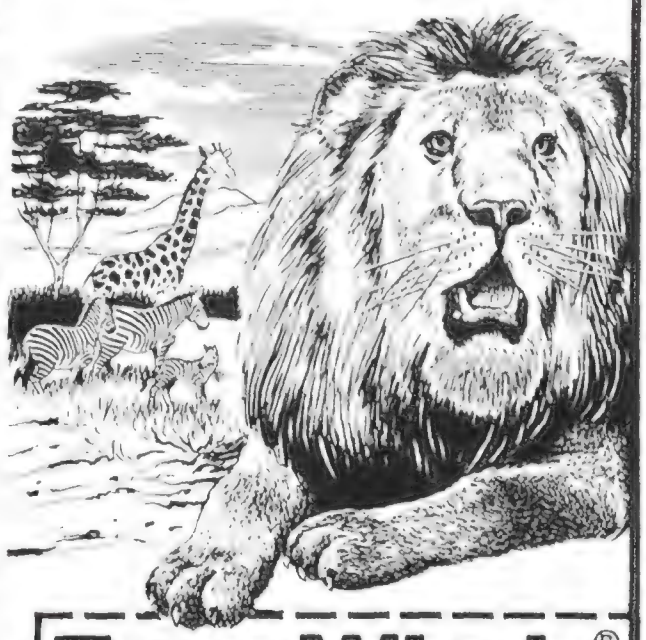

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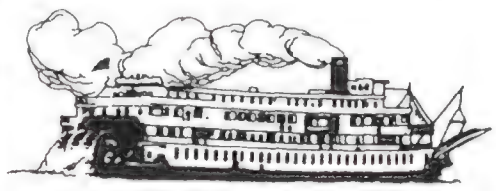

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ligence which is equivalent to that of a naive monkey.

Pure science strides on

In these problematic times when so much scientific endeavor is directed at global difficulties, one still notices some research which seems to be done for no other purpose than to satisfy curiosity. For example, three men of Harvard's Museum of Comparative Zoology have spent a considerable amount of time determining at what point such creatures as mice and dogs break out of a trot into a gallop.

Their findings, reported in *Science,* attempt to correlate speed with body mass and energy expenditure, but it is hard for the untutored mind to see much practical use of their data—except, perhaps, by cats.

Energy conservation and buoyancy

Of more recognizable value are the findings of two scientists at the State University of New York at Buffalo who have assayed the energy efficiency of various types of human locomotion. According to *Science News,* they found that men are one-quarter efficient in walking and running, but abysmally less efficient when swimming—between two and ten percent. Women are a third more efficient at swimming than men, thanks to the greater amount of fatty tissue in female legs and chests, which, of course, makes women more buoyant.

For would-be Olympians who seek a competitive edge against their aquatic brethren and a measure of equality with the women's team, a possible avenue has been opened up by research at several Massachusetts hospitals. It involves a certain amount of sacrifice—and gamble—but most athletes are presumably used to both. The idea: Smoke pot.

It seems that a heavy use of marijuana by a man can lead to what doctors (with the delicacy of the jargonizer) refer to as gynecomastia. Put more straightforwardly, there is evidence that heavy pot-smoking causes some men to grow breasts. (Apparently, according to *Medical World News,* it is unlikely to accomplish much for women.)

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200 years ago this month

New England, New Spain awaken—the latter slowly

FEBRUARY 1775

Sharing the North American continent with the 13 Colonies, yet far removed in distance and culture, is New Spain. New? It is really much older than even Virginia or New England. Cortés conquered it 254 years ago; Coronado probed north of the Rio Grande 235 years ago. And Santa Fe is a sedate adobe village basking in the sun, ten years older than Plymouth.

Yet compared to the frantic restlessness and rate of growth of British America, New Spain is slow-paced and almost nerveless. The hardships of the land—the lack of good soil and ready water—have made settlement a painstaking affair for the Spanish. And unending Indian raids —whooping, exuberant sweeps by Navajos and Apaches—have required every move to be made with caution. Moreover, the basic motivation for Spanish settlement has never shaken off the traditional obsession with gold and God. For generations—since the days of the conquistadores—it has been enough for the Spanish explorers to make a foray against some dusty pueblo, the soldiers to kill the Indians who stood in the way, the priests to convert the survivors and the administrators to put them to work. In the absence of a handy gold mine—and gold mines were always elusive—the slave labor could be useful as kitchen help.

So life continued in New Spain, a pleasant enough affair in the small, self-sufficient communal missions that have evolved as the most sensible device for Spanish colonization. Around the mission church are fields and the huts of the laborers and perhaps a rancho of some retired explorer with a noted Castilian name. The church is always beautiful, but with high windows and thick adobe walls to withstand the arrows of the raiders. A stream or well is enlisted to aid irrigation of crops. The routine of living is usually as placid and ordered as the generally sunny and mild climate. Indians move out to the fields, labor in the sun, return to the church at the sound of its summoning bells. Soldiers and administrators supervise the work and ride off on errands. Soldiers braving the wilds outside the mission wear a coat of several layers of deerskin pressed together to become impervious to arrows. They carry a

"target," or rawhide shield, and they guard their legs with a leather apron so that they can ride through heavy brush.

The padres have their own pressing duties and are often in closer communication with the world than are the administrators. Thus when a change occurs in the ordered way of life, and the mission is roused from its lethargy, it is often the

religious segment that stirs up the bubbles. And for the last seven years or so, there have been frequent stirrings.

Toward the end of the Seven Years' War, in 1763, France ceded its Mississippi Valley holdings to Spain. It didn't make much difference in the wilderness of prairies and plains and buffalo wallows and canebrake that constitute the whole area. But in the two sizable towns that break that wilderness—St. Louis and New Orleans—a few Spanish have moved in to trade beside the French who are already well ensconced. Some trade has gone to Spanish ports across the Atlantic. And in New Spain the news finally penetrated to the missions and the padres wondered what was in store for them.

Plenty was in store, as it happened, though it had little bearing on the new Spanish acquisitions to the east. In 1767, King Charles III of Spain ousted the Jesuits from his realm. His reasons were obscure. He is still considered an enlightened ruler, but also an absolutist. Probably he felt that the militant, powerful Jesuits, so full of political clout, were a threat to his power.

Anyway, away went the Jesuits from New Spain, and in came the Franciscans, eager to make a mark for themselves as brave explorers and tireless savers of souls. The head of missions in Baja California, Father Junípero Serra, soon began making his name known as a mover and shaker. He helped set up an expedition to Alta California to find Monterey from the land side—its great bay was known. Serra was not the leader, but kept faithful and detailed journals of the venture and set about founding some new missions—San Diego de Alcalá, San Carlos Borromeo de Carmelo, San Antonio de Padua, San Luis Obispo de Tolosa.

So the Franciscans are now on the move, seeking fame through an extension of the mission chain that has been slowly forged for many years. The interest in Alta California is inspired partly by rumors of Russian traders moving south from the northern wilderness beside the Bering Sea, and partly by the more frightening prospect of British ships nosing into harbors and estuaries along the Pacific coast. All Spaniards flinch a little when reminded of British ships.

Last year a brilliantly able and dedicated officer, Juan Bautista de Anza, explored north from Mexico, crossing the deserts, pushing past the pueblo settle-

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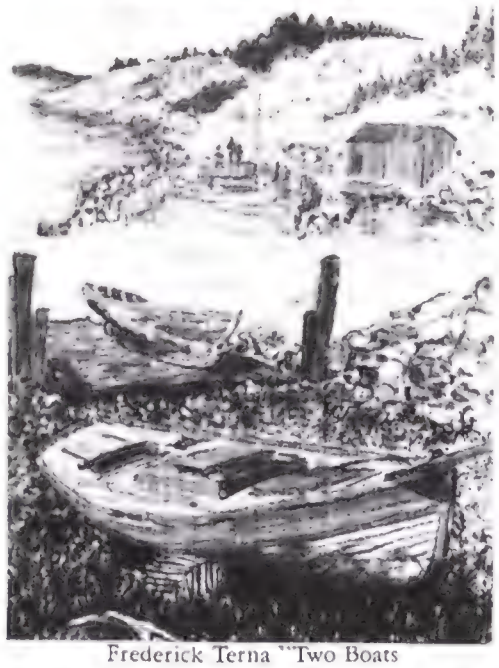

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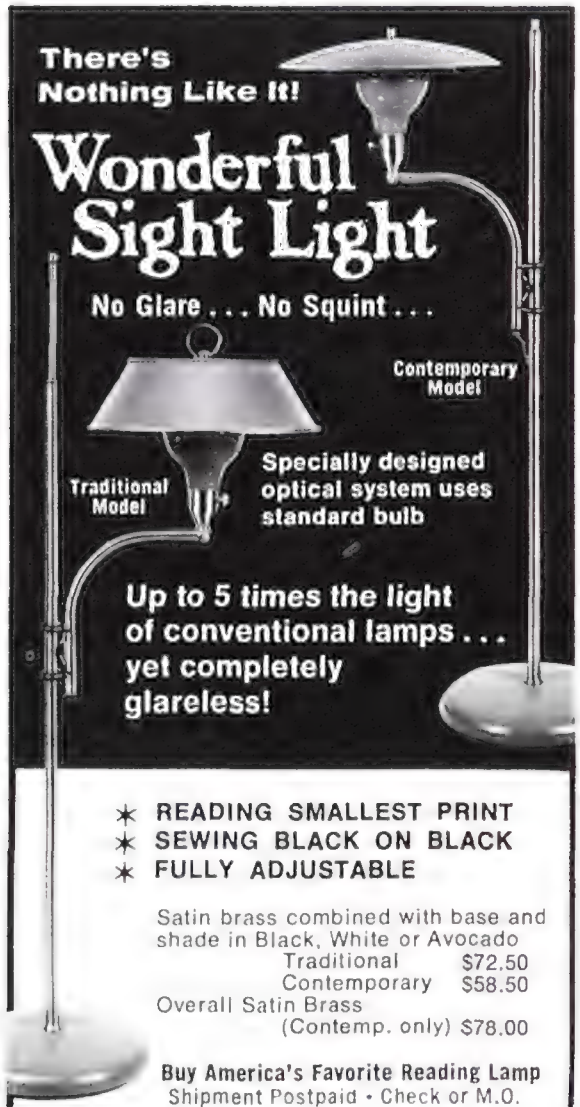

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ment of Tucson, inching westward to find a way through the Sierras and down to the coast near the four-year-old mission of San Gabriel. From here, Anza found it easier to move up the coast.

Now New Spain is blessed with at least an undercurrent of excitement, for Anza is to lead colonists along his route and up to the great arms of the sea that form San Francisco Bay. It is to be settled—a bulwark against foreign interference.

The only trouble is that recruits are hard to find. No one wants to go to that godforsaken country to the north where Indians prowl and fogs blow in from the sea, erasing the familiar benison of the sun. Anza is forced to seek out poor families in Sonora and persuade them that life will be beautiful in San Francisco.

It is certainly apt to be safer than life in the desert regions, where Indians are a constant menace. At Tubac, whence Anza plans to push forth on his journey, there is a presidio with whatever protection the soldiers can offer. But Tucson is only a *pueblo de visita*, and even eastward, in towns like Albuquerque and Santa Fe, Apaches and Comanches are apt to sweep through, robbing and burning and slaying. Excellent as the Spanish soldiers are, there are too few of them to maintain serene settlements in this vulnerable area. And the harried kingdom back in Europe has little money with which to support colonization.

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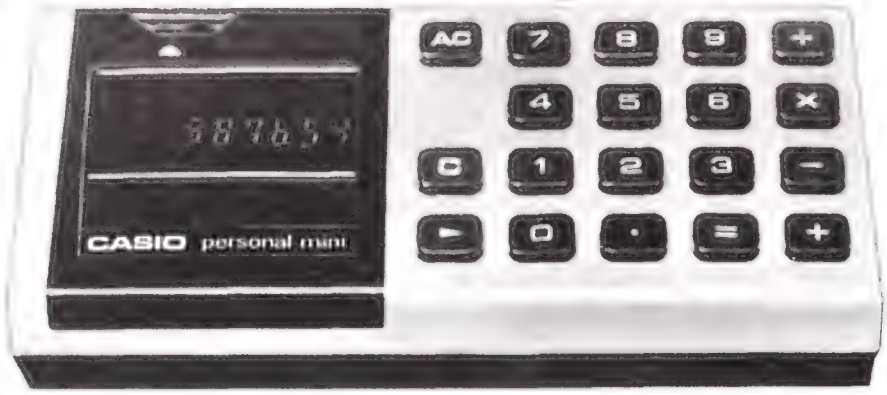

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Minister of State of Portugal, who has been in power for five years and combines dictatorship with the modern creed of the French *philosophes*. So too is Catherine the Great of Russia. Last month the head of the rebel Pugachev was removed from the body, but with his death Catherine has felt the growth of a reforming urge. She is working out a way to reorganize local government on a fair and equable basis.

England's Whigs, of course, are the very soul and fountainhead of liberalism, and on the first of this month, Lord Chatham makes another of his pleas for a peaceful settlement with America before the House of Lords. Give the Americans their own Continental Parliament, he argues, like the congress which assembled last September in Philadelphia, but keep it subject to the supremacy of London's Parliament.

It is a thoughtful idea, well presented, but America's enemies, notably Lord Sandwich, cut it down. Benjamin Franklin, an onlooker at the debate, notes that Lord Sandwich stated he "could never believe it to be the production of any British peer. That it appeared to him rather the work of some American; and turning his face towards me, who was leaning on the bar, said he fancied he had in his eye the person who drew it up, one of the bitterest and most mischievous enemies this country had ever known."

Of course Chatham is defeated again, and on the 12th of this month his friend Lord Camden writes him (Chatham is home with gout): "The Ministry are proceeding with the most mischievous expedition to plunge the nation irrecoverably into a civil war. . . ."

But the prospect is beginning to haunt Lord North himself. Feeling that he has a tiger by the tail, he suggests a tax exemption to colonies who help support the defense of the empire. Chatham reads the news and writes his reaction:

"It is a mere verbiage, a most puerile mockery, that will be spurned in America, as well as laughed at here by the friends of America and by the unrelenting enemies of that noble country."

Horace Walpole, writing to Horace Mann on the 15th, speaks of "the war with our colonies which is now declared." And King George, certain now that his troops will soon be deployed in America, goes over his army list, working out what officers will command which units. The

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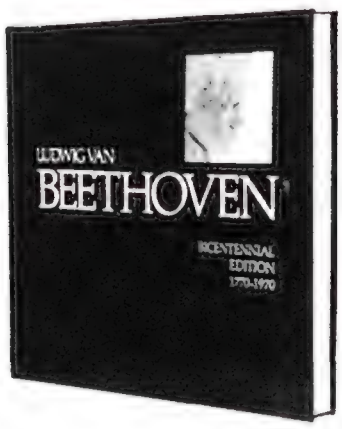

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way seems clearer to George than it has for a long time.

New England, for once, gets a mild winter. Freed of binding ice and numbing cold, the local leaders of small towns around occupied Boston scheme ways to increase the supplies of gunpowder that have run low. There seems to be no doubt in anyone's mind but that the powder will be used in the spring. General Gage, meanwhile, hears the tales of these activities from Tory informers and works out ways to stop the leaks of powder.

On the first of the month the Massachusetts Provincial Congress meets to prepare the colony for a state of war. Concord is now the seat of this government, since Boston is a sealed city.

And Salem becomes the theater for a fine bit of melodrama which relieves the dullness that late February always brings to winter-bound New England. On the 25th, the 64th Foot, under command of Colonel Leslie, sails from Boston's Castle William to Marblehead. The soldiers arrive around noon of February 26.

They then form up and start marching the few miles to Salem—240 redcoats, ordered to destroy an arms depot. But one American officer, thought by Leslie to be a Tory, passes them and races to warn the town. The minutemen are out in a flash, glad perhaps to have an excuse to get out of church this Sunday.

Some two score Americans set off to remove some brass cannon—that job is done and the bridge leading to the hiding place has been removed when the scarlet column twinkles into sight.

Some British soldiers grab a boat and ferry themselves across. An American stoves in its bottom with a rock, then bares his breast dramatically before the British bayonets—and is obliged with a pinprick wound from an infantryman.

The British now fall into battle array and prepare to fire. But American leaders across the stream make some mild Yankee suggestions that allow them to leave without too much loss of face.

The man with the chest wound goes around showing all his friends in the tavern how he spilled blood for the Cause. It's worth free rum to him.

And the fact is that real war has come within an eyewink of exploding this quiet Sunday afternoon.

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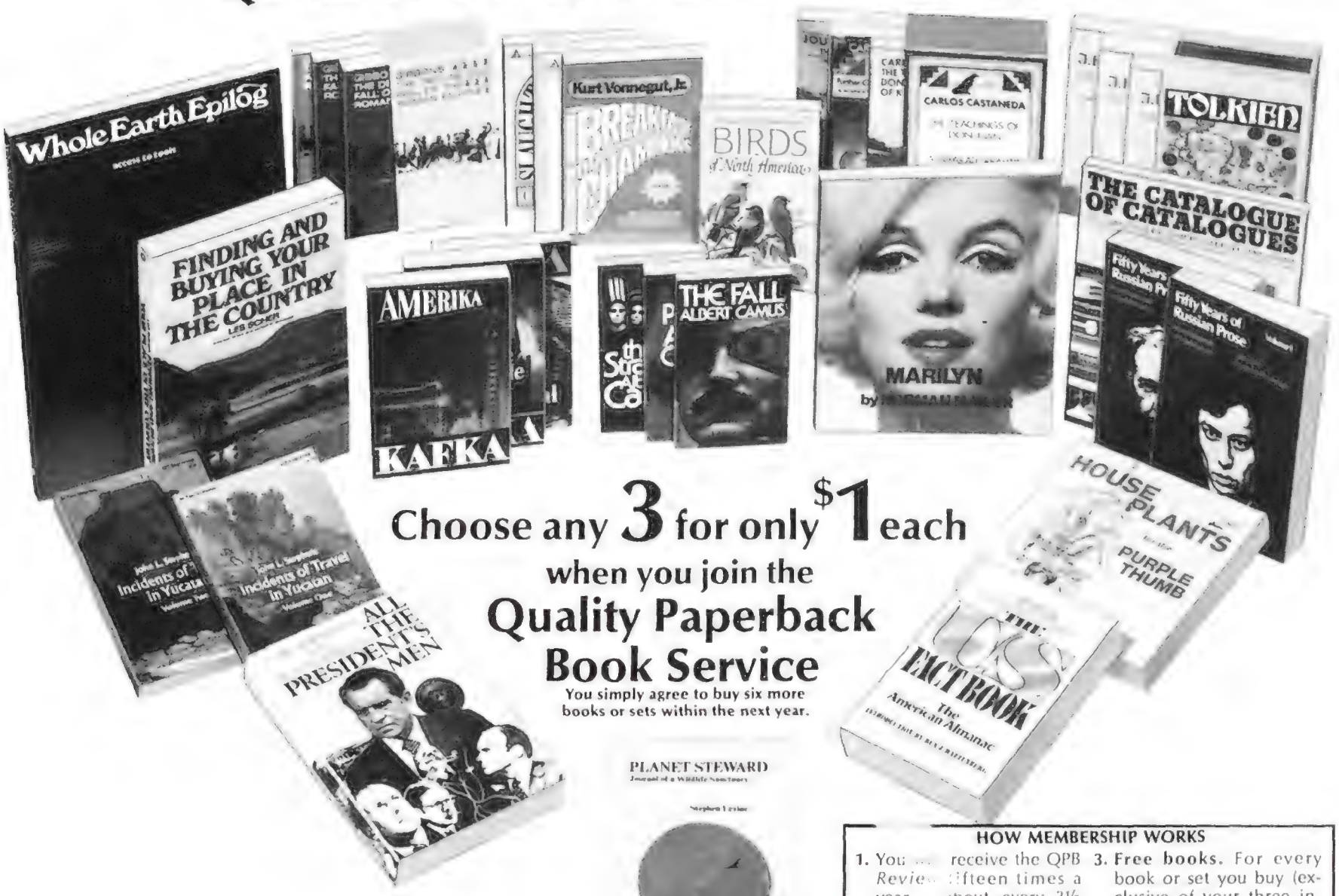

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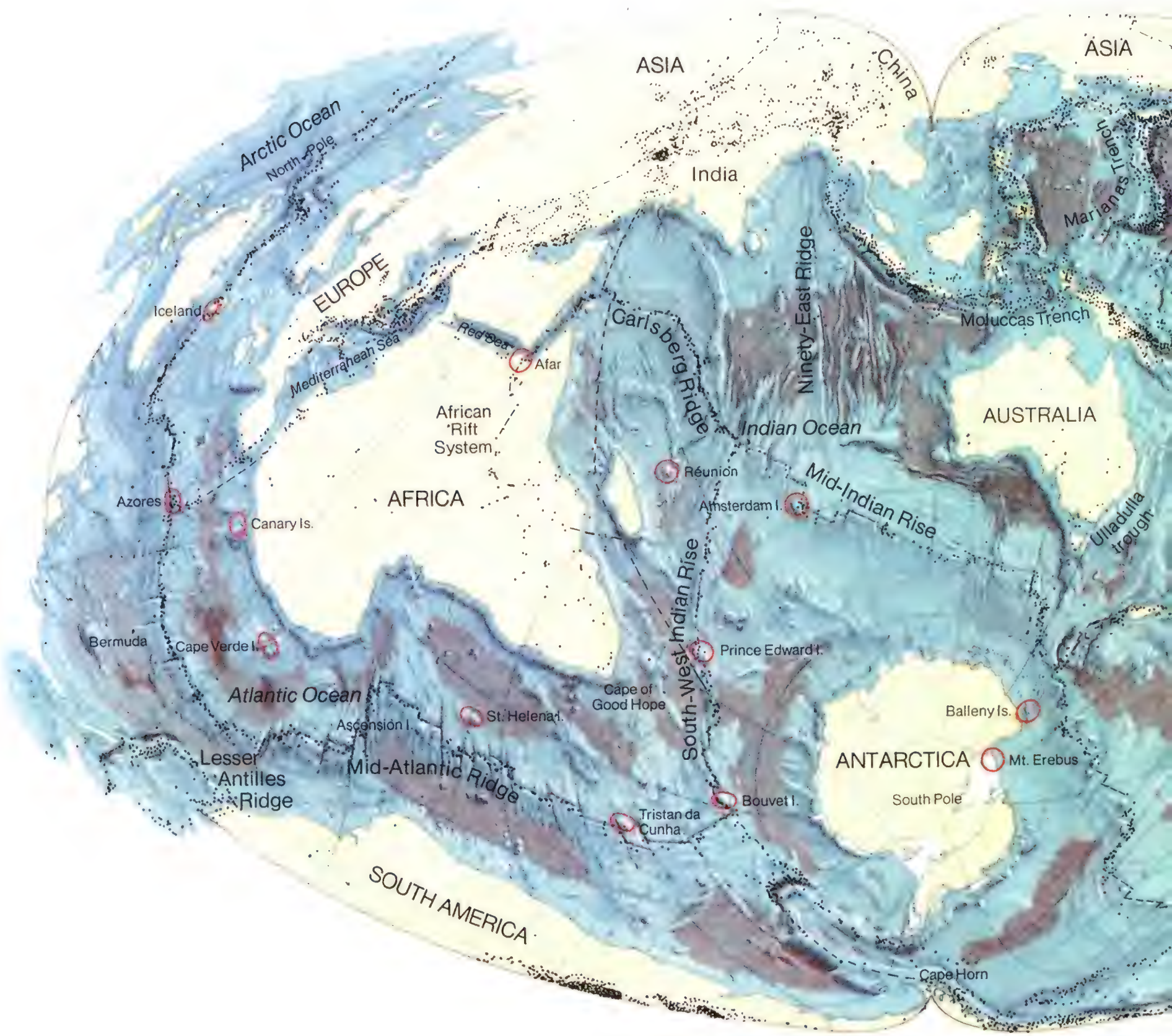
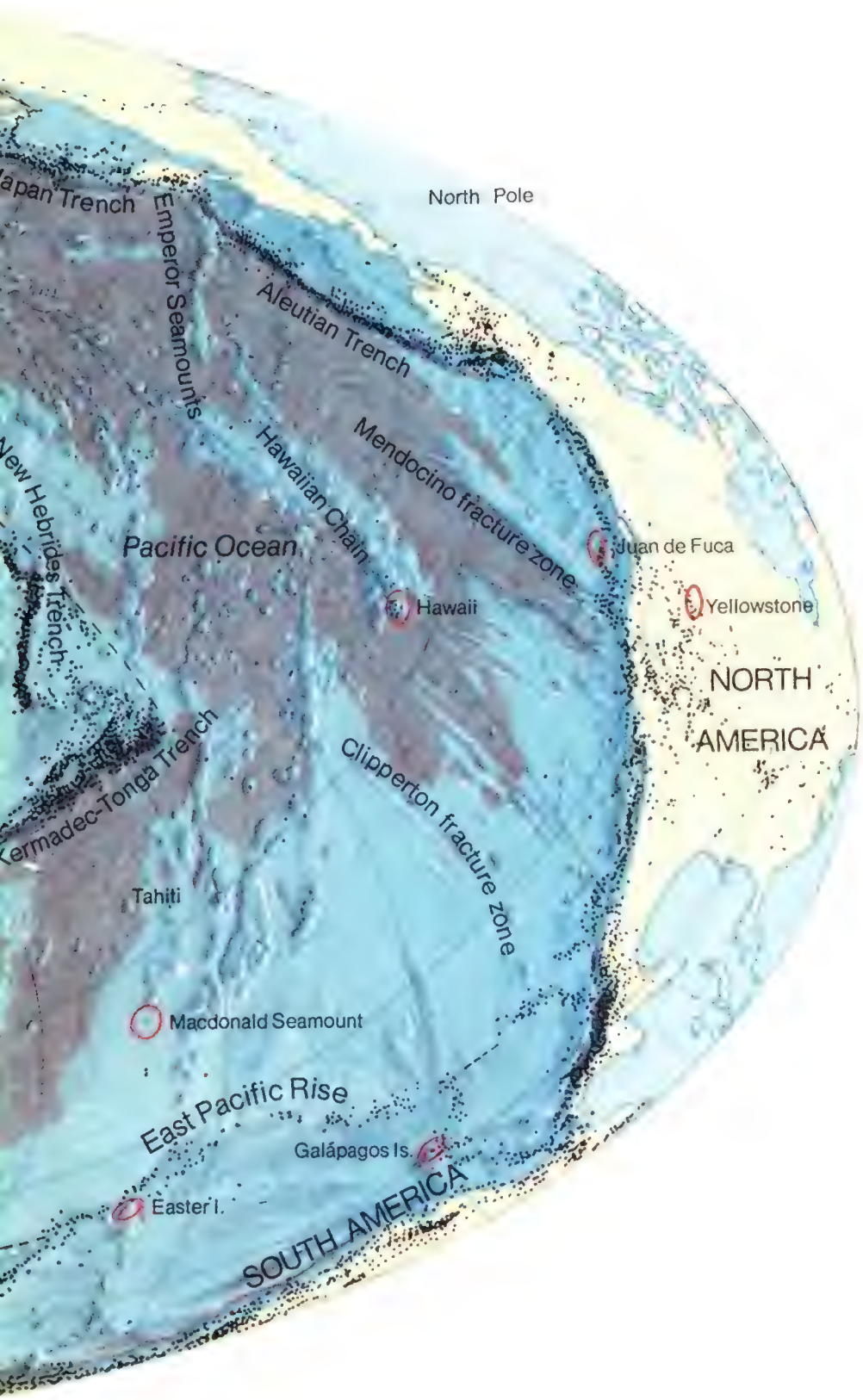
Second of two articles

Plate tectonics has a lot to tell us about the present and future Earth



Our new view of the Earth is not only intellectually satisfying, it has ramifications that can affect our lives

By Tom Alexander
Illustrations by Richard Edes Harrison and Antonio Petruccelli



The black dots peppering this map are earthquake sites; they neatly outline the plates into which the Earth's crust is divided and explain the origin of most earthquakes: rumblings where plate edges intersect. The circles (some are distorted by the Earth's curvature) mark the locations where plumes of hot mantle material are forming islands and chains of islands. More than 120 have been located.

For all the data-gathering drudgery that science demands, from time to time she offers her suitors one of the most exciting intellectual experiences men can have—the chance to participate in a "scientific revolution." After centuries of plodding achievement, the scientists who study the Earth can finally share the excitement of rapid progress—of being able to sit down to lunch with a colleague and after a few minutes of discussion arise with a provocative new idea that will find its way into one of the elite scientific journals such as *Science* or *Nature*. Says Walter Pitman, a geophysicist at Lamont-Doherty Geological Observatory, "It's funny what a thrill it is having an idea so simple as to be obvious."

Nowadays, Pitman and the rest are busy working out all the implications of plate tectonics, the theory that has recently swept through the earth sciences like a forest fire, clearing out the impenetrable underbrush of old notions to make room for productive new growth. As outlined in SMITHSONIAN last month, plate tectonics sees the entire Earth as a dynamic entity encased in moving crustal plates which are even now being manufactured by deep-lying processes at work within the Earth's interior. These plates emerge at the site of the mid-ocean ridges that twine about the globe. Driven by implacable and still not-altogether-comprehensible forces, these plates move off around the world to be eventually drawn into the mantle from whence they came. Although deceptively simple, this

The implications of plate tectonics

mechanism not only gives explanations to numerous long-standing puzzles, but is being invoked to explain a great many things that the geology textbooks have quietly skirted.

One of the earliest puzzles to be solved was the origin of earthquakes. As mentioned last month, these are really shudders due to friction in this massive machinery. In fact, earthquakes have been one of the main sources of information about the mechanism. Plotted on a map, earthquake sites outline the plate profiles, while their vibrations yield data about the deep Earth. But plate tectonics in turn provides a needed theoretical focus for those trying to predict quakes. At the simplest level, it shows that most earthquakes occur where plates abut. One day, it may even lead to ways of reducing the tremors' severity. It is clear that the really damaging quakes are the result of the sudden release of stress that accumulates when plates lock together. But man may be able to learn how to lubricate the junctures, perhaps by injecting water into the faults, so the plates slide by each other instead of locking together.

From the parochial viewpoint of the land dweller, the most important products of plate tectonics are the continents, those scattered blocks, largely of granite, that occupy not quite a third of the Earth's surface. A peculiar thing about continents is that they persist despite the steady attack of rain, wind and tide. At the present rate at which erosion proceeds, the continents should be planed down so that the oceans would wash over them in about 40 million years. This means that over the history of the Earth they should have vanished at least 100 times over. But it's clear that the continents are not only growing bigger, but for the most part higher.

Continent-making, it appears, is a multistage process. The first step occurs beneath a spreading ocean ridge, where hot material wells slowly up from the mantle. Nearing the surface, certain components in the conglomeration of substances actually liquefy, being relieved of the pressure that has squeezed them into solidity. This liquid, or magma, can then work its way upward faster than the remaining solids, creating a topmost crust of ocean floor basalt rich in lightweight materials such as silicon, aluminum and magnesium. As this layer moves off across the ocean bottom in plate form, it accumulates an overlayer of sediment, partly material eroded from continents, partly the remains of sea life.

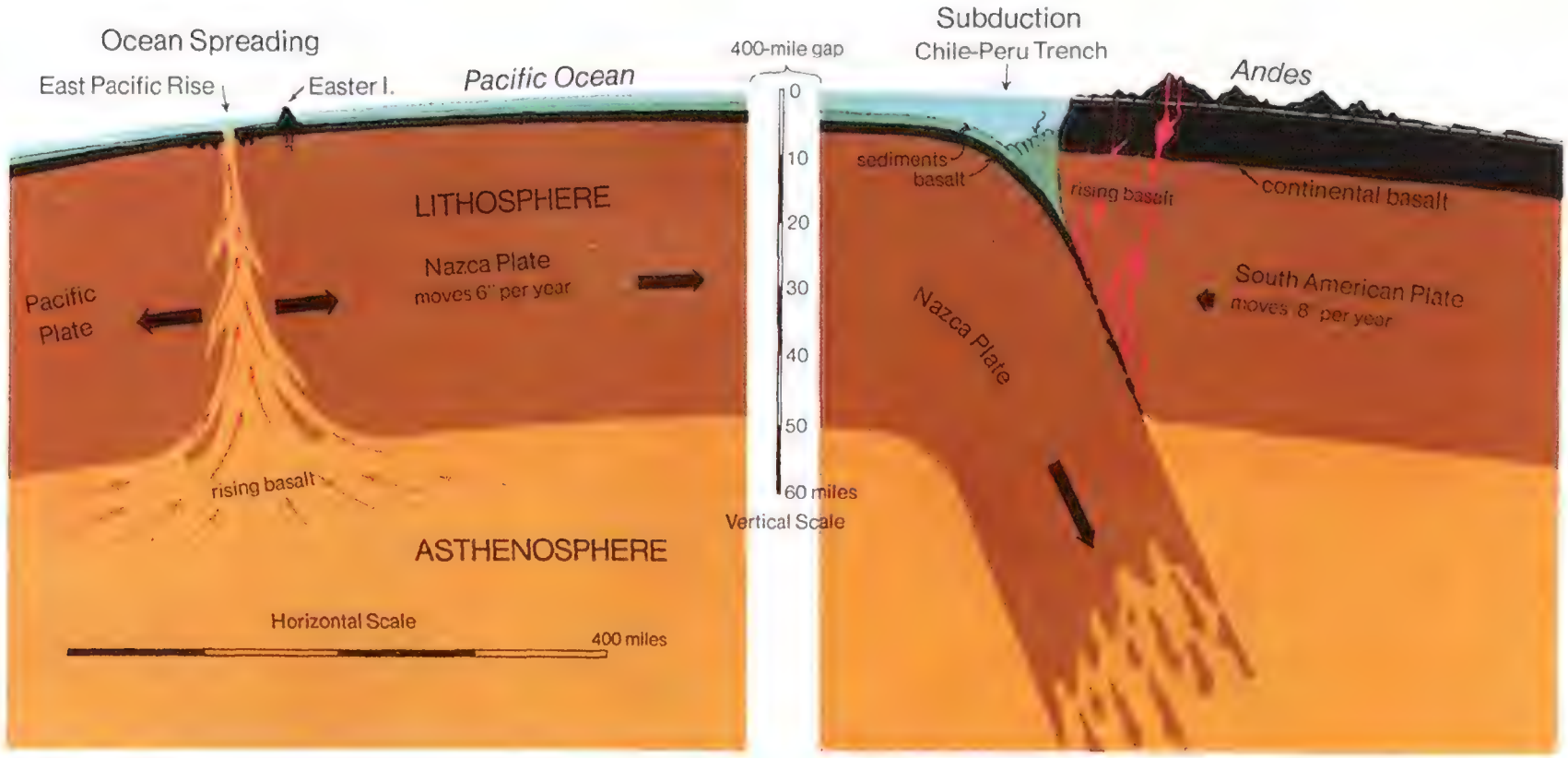
From this point on, several fates are possible for this crust. If two plates encounter one another head-on with comparatively gentle force, it appears that the plates will simply butt their edges together and slowly deform each other, emerging above sea level as great folded mountain ranges. The Alps are a recent example of such distortion, the result of a still on-going clash between the continents of Africa and Eurasia that began about 80 million years ago. Obvious ancient seabed material can still be located high in Alpine regions.

Where the opposing plate motions are rapid, there are different results. The most rapidly spreading of Earth's ridges is the East Pacific Rise, which extends roughly southwest from the mouth of the Gulf of California. With plates traveling away from this ridge at a rate of four or more inches a year, the motions are too rapid for simple rock deformation to accommodate. When a Pacific plate encounters an opposing continental plate—such as the Asian or the South American mainland—the sea-floor plates have buckled and broken under the strain and become deflected downward into the mantle.

Genesis of underwater volcanoes

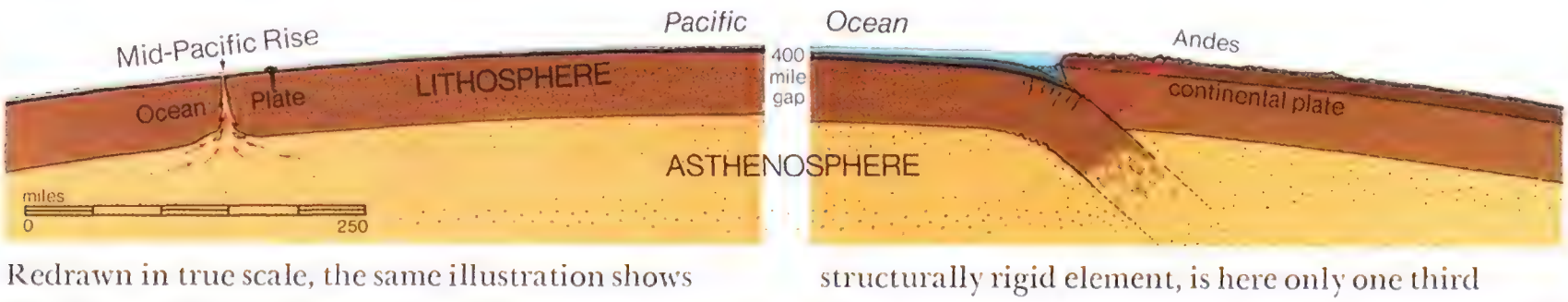
Again, there are two possible ways that plates can manufacture new continental material. If a plate slips under a landmass that is floating more or less stationary over the underlying mantle, as is the case with Asia, the typical offshore island arcs are formed. As the plate and its sediment return into the high temperature mantle, they undergo additional chemical processing or "differentiation." Once again, there is selective melting of the lighter materials, including the sediment, and these tend to float off and percolate upward. They form rising columns or blobs, called diapirs, that eventually poke their way through the overriding plate in the form of strings of offshore

Tom Alexander wrote the text and Richard Edes Harrison and Antonio Petruccelli did the illustrations for the first of these two articles in January.



New crust is formed along ridges where hot material wells up to the surface. The Earth would keep growing larger unless crust were also consumed.

At a trench, edge of one plate dives under another to be melted again. A five-to-one vertical exaggeration makes the plate appear thinner as it descends.



Redrawn in true scale, the same illustration shows just how shallow are the oceans and how low the mountains. The lithosphere, the Earth's only structurally rigid element, is here only one third of an inch on a ball more than five feet in diameter. In proportion, the crust is thinner than an egg shell.

underwater volcanoes. These volcanoes pile up until they poke their conical heads above water. The reason for the arc-shaped array can be demonstrated by pressing down on one side of a tennis ball and observing the resulting dimple that will have a curved perimeter.

Something else happens if the overriding plate itself is moving, as is the case with South America. Island arcs never get a chance to form. Instead, the overriding plate keeps sweeping toward the trench, shoving it ahead. The sediment coat on the Pacific Ocean plate seems to get scraped off by the overriding granite roots of the Andes. This adds thickness and buoyancy to the mountains, so that they keep being shoved upward faster than they can be eroded downward. At the same time, some melting and rising of volcanic materials goes on beneath the Andes just as it does in island arcs.

One interesting thing about continents is that once they form, unlike ocean floors, they never disappear. These lightweight structures float serenely above all that plate turmoil like the froth on a bubbling pot of soup. They can, and do, undergo all kinds of transformations, though.

There is evidence that sea-floor spreading activity occurs in fits and starts. For one thing, if two continents collide, neither dives under, so their bulk is likely to jam the plate motions temporarily. It's pretty clear that at one time the super-continent of Pangaea was assembled from a number of continental bits and pieces, each of which may not have been too different in appearance from some of the present continents. North America was one piece that apparently got jammed into the Pangaea landmass some 500 million years ago. The force of the collision raised the Appalachian range and also jammed the plate movements. But the juncture line where the continents were welded was apparently a weak one. Something—perhaps plumes of rising mantle material at work under Pangaea—probed this ancient weakness and split North America off again. Another locking event may occur when the edge of a rigid diving plate strikes the rigid lower mantle, or mesosphere, and can't penetrate any

deeper. At that point, subduction ceases, the overlying volcanoes grow cold. If the shoving forces are strong enough, however, the slab of submerged plate breaks off and a new island arc starts somewhere else.

Over time the random movements of the plates are likely to crush old island arcs against their adjacent continent, welding them on as permanent additions. Geological fieldwork of recent years suggests, for example, that the Eastern United States consists of layer upon layer of crushed-in island arcs.

There are still other ways to create mountain ranges. The Rockies, for instance, are rising today even though they lie far from any plate edge. Many believe that what happens there is simply a buckling, produced by the squeezing plate action on a previously fractured region of the continental crust.

A special event seems to have been responsible for the world's highest mountains, the Himalayas. The entire peninsula of India was once a separate continent embedded in a northward moving plate that was diving under Asia. This went on until India collided forcefully with the mainland and its nose became wedged underneath. This shoved up the double-thick region represented by the Himalayas.

With the looming prospect of resource shortages, one of the most exciting practical insights to emerge from the new earth theories is a probable explanation for why mineral ores occur where they do. Plate tectonics, it is clear, amounts to a vast multistage process for chemically extracting traces of minerals from the primordial mantle rock and then collecting these traces into exploitable concentrations. The process can be seen occurring right now in the Red Sea, where Africa is being split off from Eurasia by the rifting process. Oceanographic expeditions in the mid-Sixties startled geologists with evidence that the bottom of the Red Sea is pocked with hot brine springs. When analyzed, this brine turned out to be largely a solution of compounds of valuable metals, including copper, gold, silver, iron, nickel, zinc and cadmium. Several deep seabed basins are layered hundreds of yards deep with muds that turn out to be metallic ores.

The most favored hypothesis for the origin of the brines and muds is that as new basalt emerges near the upwelling zone, it cools. As it cools, it cracks. Seawater is naturally rich in sulfur and chloride compounds that serve as powerful solvents under conditions of great heat and pressure. Infiltrating down through the fractured basalt like water through ground coffee, the seawater leaches out metal traces from the original basalt. These solutions seep into the hot central regions below the rift where convection drives them back upward. Once at the surface, where the water is cooled and relieved of its pressure, the elements precipitate from the solution as the mineral-rich mud. Within the last year or so the Deep Sea Drilling Project found this same "hydrothermal" refining process going on at the spreading ridges in both the Pacific and Atlantic oceans. Some portions of deep ocean floors seem virtually paved with ores and occasionally even veins of pure metal. One of the world's oldest and richest copper mining areas, dating back to 3000 B.C., is the island of Cyprus (the English word "copper" is derived from the Latin *Cyprium*). Cyprus is actually an ancient section of the seabed that has been elevated by plate tectonic buckling.

Hydrothermal reactions bring minerals to surface

Usually, though, still more refining and collection goes on in the island-arc regions, where diving plates either plaster veins of metals such as copper against the overriding plate, or else carry the mineral layers back into the mantle, together with a lot of the seawater incorporated in the sediment. As these materials reach sufficient depths, the same hydrothermal reactions occur again. The metal-rich solutions percolate upward, eventually depositing their minerals as ore bodies in the volcanic piles above. It is clearly no accident that most of the mineral beds now exploited are found in the vicinity of plate subduction zones, past or present.

Though details and reasons are still being worked out, one of the fascinating discoveries about the island-arc refining process is that different minerals tend to be deposited separately in predictable sequences, first lead, then zinc, then copper, and so on. This amounts to a potentially revolutionary development for mineral prospectors, whose work heretofore has usually amounted to a hit-or-miss search for surface outcroppings of ore. Most such outcrops have long since been found and exploited. With awareness of

A rising column of hot mantle basalt (left) cools and cracks as it reaches the crust. The cracks then widen (center), admitting seawater rich in chlorides that dissolve metals in the basalt. Now hot, the water rises to the surface again and deposits metal ores on the sea floor as silt (right); the basalt has been transformed into green schist.

the chemistry and mechanics of the ore-forming process from plate tectonics theory, metal prospectors may soon be able to select likely places to drill for subsurface deposits, just as petroleum geologists long ago learned to do.

Petroleum geologists themselves are following plate tectonics development avidly, for it is now clear that old plate convulsions were mostly responsible for oil-forming conditions. What's required is a sea with continents arranged around it to restrict ocean-water circulation. This permits sediment to collect from adjacent continents and evaporation to form the salt deposits that trap the oil and gas. Ideal places for all this are the long, narrow valleys that form when continents are being stretched apart along lines of incipient spreading. Oil can form in such waters during the millions of years that transpire before the separation is complete. Then, after the break is complete, the two halves of the basin go sailing off on their separate paths. But if oil geologists find oil in one of these halves, they have only to work out the course of its mate and it is likely they will find oil there, too.

This theory, which allows continents to rearrange themselves, suddenly removes one of the greatest sources of perplexity for paleontologists trying to account for past anomalies of biological evolution. Among the most fascinating and long-standing riddles of science, for example, have been the abrupt and worldwide discontinuities in ancient life-forms, as revealed in the stacked layers of fossil-bearing sediments. These changes, in fact, serve as principal markers for dividing geological time up into eras, periods and epochs. One such transition, for example, occurred some 65 million years ago and marks the boundary between the Mesozoic and the Cenozoic eras. From the fossils it is clear that, in a remarkably short span of time, the character of life on our planet changed almost completely. The most dramatic event was the "great extinction" of all the dinosaurs at the very time when they had reached the peak of their development in size, number and diversity, reigning as undisputed lords of the Earth.

The former prevailing doctrine of uniformitarianism could furnish no "earthly" explanation for such catastrophes, so paleontologists were driven to propose everything from disease epidemics to radiation from exploding stars. Now, though, a great many clues fall together in the framework of sea-floor spreading to create a plausible scenario of why the dinosaurs disappeared—and for that matter, why they had thrived in the first place. While great gaps in the evidence still don't make it possible to do more than sketch outlines, the key scene-changes in the drama appear to have been rung by episodic pulses of sea-floor spreading. These brought about redistributions of continents, worldwide changes in sea level and global climate alterations.

The further that geologists and paleontologists try

to peer into that past, of course, the scantier the evidence. There are virtually no sea-floor areas left, for example, that date further back than 225 million years, for the simple reason that any created before that time has since been consumed in a trench. It may be no coincidence, though, that 225 million years in the past marks the boundary between the Paleozoic and Mesozoic eras. Some event that occurred around that time brought about a worldwide transition from largely marine-based life forms to land-based life forms. This included the outright extinction of many species and the emergence, first, of amphibious reptiles and, later, of a variety of ungainly land dwellers including a few early dinosaurs.

By retracing the motions of the plates, scientists have determined that throughout the Paleozoic, the supercontinent of Pangaea was intact. And it is unmistakable from glacial grooves carved in bedrocks of the Sahara Desert and then contiguous parts of South America, India and Australia that in the early Paleozoic these regions were covered by great sheets of ice. The clear implication is that they, including Antarctica, lay in the vicinity of the South Pole.

The location of so vast a landmass—particularly an ice-covered one—would have an immense effect on the climate of the entire Earth. For one thing, there would have been no ocean circulation near this polar region, and ocean circulation is a principal mechanism for distributing heat between equator and poles and moderating world climate. For another thing, global climate is greatly affected by the total amount of ice and snow cover at a given time. Since snow and ice are efficient reflectors of sunlight, they reduce the amount of solar energy available to warm the Earth and atmosphere. Hence, the climate of early Paleozoic Pangaea would undoubtedly have been cold, with even ice-free regions afflicted by violent and inhospitable weather extremes characteristic of the interiors of large continental landmasses today.

Most of the entire Northern Hemisphere, by contrast, would have been washed by warm water from the equator to the pole, with essentially no seasonal change—a perfect medium in which to culture a thriving marine life. Toward the middle and close of the Paleozoic era, say about 400 million years ago, the vast southern landmass of Pangaea probably began to drift equatorward. The glaciers melted, ocean waters rose and were free to sweep from pole to pole. Overall global temperature grew warmer with the disappearance of the ice, while land temperatures showed increasingly less seasonal variation. At the same time, though, ocean temperatures fell due to their access to the South Pole, spelling the end of numerous underwater species. Some evolved into amphibians that could eventually make their way up into the newly hospitable beaches.

After the Mesozoic begins, the geological picture grows clearer. Remarkable things begin to happen, triggering vast changes not only in the shape of the globe but in the shape of the life that inhabits it. In the first place, Pangaea begins breaking up, form-

When continents started to drift (left), bulging ridges raised the sea level; improved ocean circulation warmed the entire globe. This left

ing Laurasia to the north and Gondwanaland to the south. Antarctica begins slipping southward once more, perhaps taking Australia with it.

The magnetic stripes on the sea floor indicate that around 150 million years ago North America took off northwesterly, followed 25 million years later by South America. And from then on the fossil record shows that land-dwelling creatures, which up until then had been virtually identical everywhere, began to follow different lines of evolutionary development on each of their isolated continents.

Last year two pioneer workers in plate tectonics at Lamont-Doherty Geological Observatory, James Hays and Walter Pitman, gave a pretty convincing explanation of what probably happened in the mid-Mesozoic to give the dinosaurs their boost to world dominance—as well as what brought them to their doom.

Earlier, Pitman and Roger Larson, also of Lamont, had deduced from the ages of deep-sea drilling sediments and the width of seabed magnetic stripes that a sudden worldwide burst of sea-floor spreading activity began 110 million years ago. Hays and Pitman pointed out that a certain consequence of such a pulse would be to raise the high-water mark of all shorelines in the world. The reason is that ocean ridges, the principal route by which heat escapes from the Earth's interior are, in fact, a direct consequence of that heat—they are simply the effect of heat expansion in that region. While a rapidly spreading ridge is probably no higher than a slowly spreading one, it is nevertheless a lot broader because the uplift spreads farther horizontally before it cools and shrinks. The East Pacific Rise is an example of a rapidly spreading ridge and unlike the Atlantic ridge, it is broad, with gentle slopes. Such a ridge also displaces a lot of water from the ocean beds, which has no place to go except up onto the land. The calculations of Hays and Pitman showed that the pulse of ridge growth apparent during the middle-Mesozoic could have raised water levels as much as 1,500 feet, thereby inundating more than 40 percent of the existing land areas.

This would turn some continents into island archipelagos and send shallow seas and marshes deep into the interiors of others. Climatologically, this would have several effects: It would greatly increase the transport of heat from the equator to higher latitudes. Seasonal change would also diminish. Such conditions, of course, are perfect for cold-blooded reptile life,

shallow seas (center), and no winter, ideal for reptiles such as dinosaurs. Then spreading slowed (right); the water receded and winter returned; the dinosaurs had no defense against cold. The arcs represent the temperatures at various latitudes in the three eras: red is hot, green is cool and blue is cold.

which can't survive temperature extremes like those our planet experiences today.

But around 85 million years ago, toward the end of the Mesozoic, Pitman and his colleagues have deduced that the pulse of spreading began to die down. The ridges shrank, the oceans receded. Still, the splintered, northward-moving landmasses kept converging on the North Pole, perhaps obstructing polar currents. By that time, furthermore, all the earlier spreading had generated a worldwide uplift of mountain chains, including the Rockies, the Andes, the Alps and the mighty Himalayas.

According to present climatological theory, all these events would have the cumulative effect of increasing the temperature difference between the equator and the pole, chilling the Earth as a whole, and increasing the day-to-day and season-to-season variation of temperatures and rainfall. The climatological stress would have been too much for most of the existing life forms. The great reptiles would have been too large to burrow into the earth for protection like their tiny descendants of today. By the end of the Mesozoic, 65 million years ago, they were gone.

Though the pace of sea-floor spreading is, in biological terms, almost inconceivably slow, the process is even being invoked to explain oddities of behavior in present-day animal species. For example, there is a subpopulation of green sea turtles that make their home on the coast of Brazil but breed and nest some 1,100 miles away on tiny Ascension Island in the mid-Atlantic. Not only has it been difficult to explain how the slow-swimming turtles can accomplish so prodigious a feat, but there's the puzzle of why they feel it necessary to do it.

Biologist Archie Carr of the University of Florida and paleontologist Patrick Coleman of the University of Western Australia suggest that the extended migrations have been programmed into the animals' genes by the operation of the mid-Atlantic Rift.

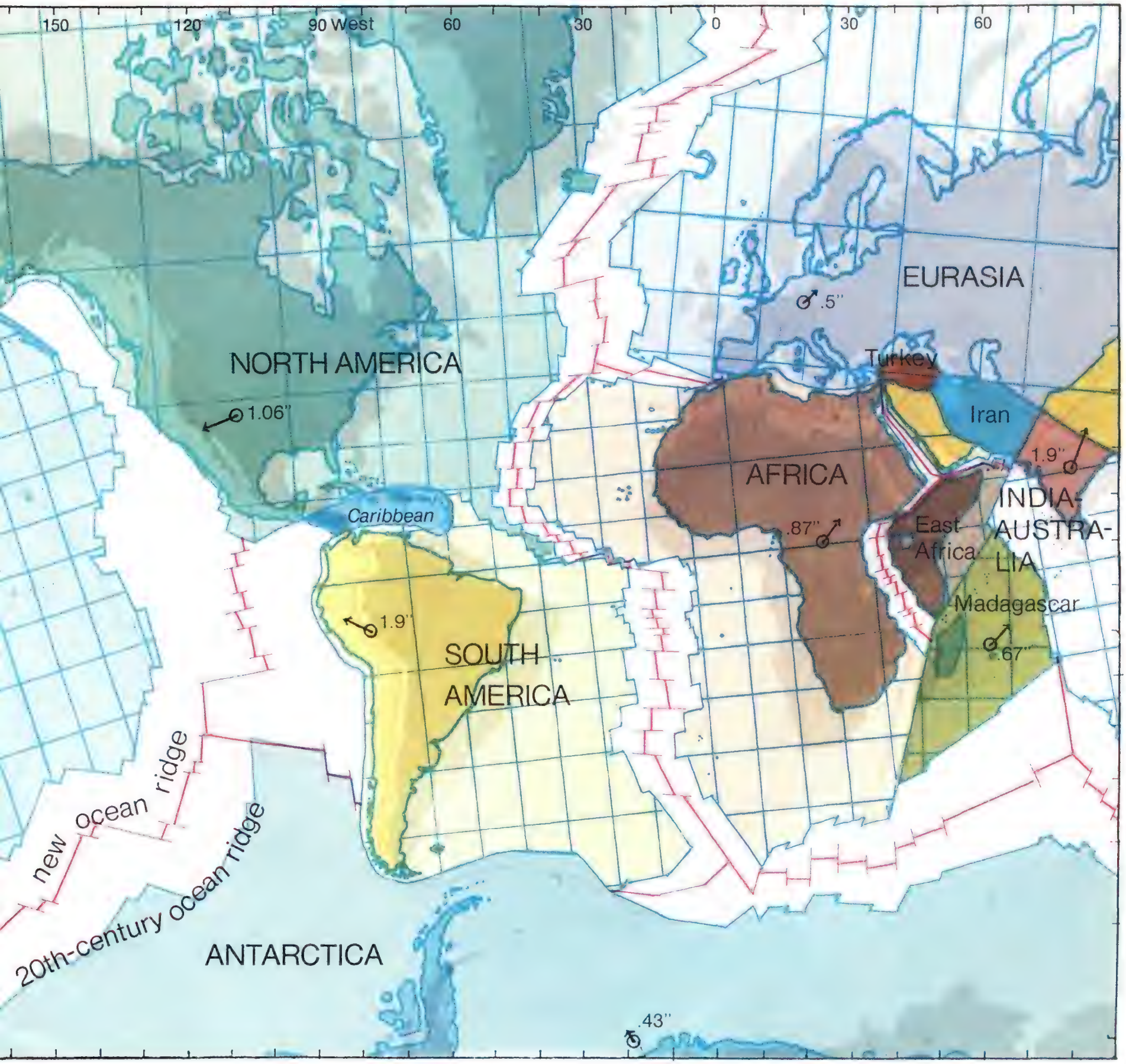
They point out that turtles often prefer to nest on the beaches of off-shore islands, where their eggs are protected from the nest predators of the mainland. As the opening between South America and Africa began around 100 million years ago, there probably was a colony of turtles that nested a few miles offshore on one of the volcanic islands formed by one of the plumes that created the rift. As the rift widened, the turtles swam just a little farther each year. They probably used the sun as a navigational beacon to reach the island. In time, however, their island descended the slope of the mid-Atlantic Ridge and eventually was submerged. But by that time a new volcano had poked its head above water atop the rift. As the turtles' navigation led them to an island that was no

If the crustal plates continue to move at their current rates (shown for each plate), they will have reached these positions in 50 million years. The dark, "ghost" images show where the continents are today in this familiar Mercator projection, while the white areas are new sea floor. Note that some of the mid-ocean ridges have moved, while at least one present-day plate has been completely subducted.

longer there, they had only to continue on the same course to reach the new island. In essence, they return to the same plume, if not the same island.

Over the millions of years since then, a number of similar emerging and subsiding islands have tempted the indefatigable turtles into greater and greater excursions. One of the odd things, as Carr points out, is that over the course of so many years of evolution, the physical appearance of the turtles has become very different, but their fundamental behavior has remained indelibly inscribed. "We take comfort in the realization that species are more than flesh and bone, especially bone," say Carr and Coleman.

These are just some of the implications of plate tectonics: The revolution is still going on, and more pieces are falling into place. New ramifications, some of which will affect our daily lives, continue to appear in the scientific journals. But like astronomers after Copernicus, geologists know their world will never be the same.



On home grounds, New Canaan, Connecticut, Philip Johnson delights in the small scale of his pavilion.

By Paul Goldberger

Philip Johnson's eminent, elegant, practical world

This scholarly designer and resident of the world's most visible glass house is not afraid to throw stones

There are few architects who could claim, as Philip Johnson can, that they live, work and weekend in buildings which they designed themselves. But Johnson spends his weekday nights in a townhouse on East 52nd Street in New York which he designed in 1952, goes to work in the Seagram Building on Park Avenue, which he designed in association with Mies van der Rohe in 1958, and escapes each weekend to his famous glass house of 1949 in New Canaan, Connecticut.

Johnson's situation is made more curious still by the fact that all three buildings derive from the early, or "Miesian" period in his career, when he was perhaps the late architect's chief propagandist (he published a book on Mies' work in 1947) and all of his own work was rather unashamedly Mies-inspired. Now Johnson's work is markedly different: After a middle period of somewhat overdelicate classicism (an obvious, and sometimes rather strained, attempt to break free from the grip of Mies' austere steel-and-glass vocabulary), he has moved on to do a series of buildings which are notable for a freshness of form which confirms his position as one of the most inventive designers in America today.

Johnson's career as an architect has been marked by a rejection of rules and theories; he is too fascinated by pure form for that. Yet his work is saved from the superficiality of change for its own sake by a superbly disciplined design intelligence which demands an intellectual justification for every new form, and sees every building as part of a larger problem of architec-

Washed with light under a greenhouselike glass roof, visitors crowd Johnson's private sculpture gallery, one of five buildings which make up the famous "glass house" estate built over a period of two decades.

tural history. Vincent Scully, the architectural historian, put it best when he called Johnson "admirably lucid, unsentimental, and abstract, with the most ruthlessly aristocratic, highly studied taste of anyone practicing in America today. All that a nervous sensibility, lively intelligence, and a stored mind can do, he does."

Johnson, a scholar by training who came into architecture after years as an architectural historian, has always been one of the few architects in this country to acknowledge freely the importance of history in contemporary design; the "stored mind" to which Scully refers was admitting the validity of historical allusions while many other modernists were still indulging in the Bauhaus fantasy of breaking clear of historical precedent. For Johnson, then, his own Miesian buildings are now themselves history—he works in the Seagram Building as he might work in Louis Sullivan's Wainwright Building, as a place to be learned from but no longer to be imitated. And so it is, too, with the 52nd Street house and the glass house.

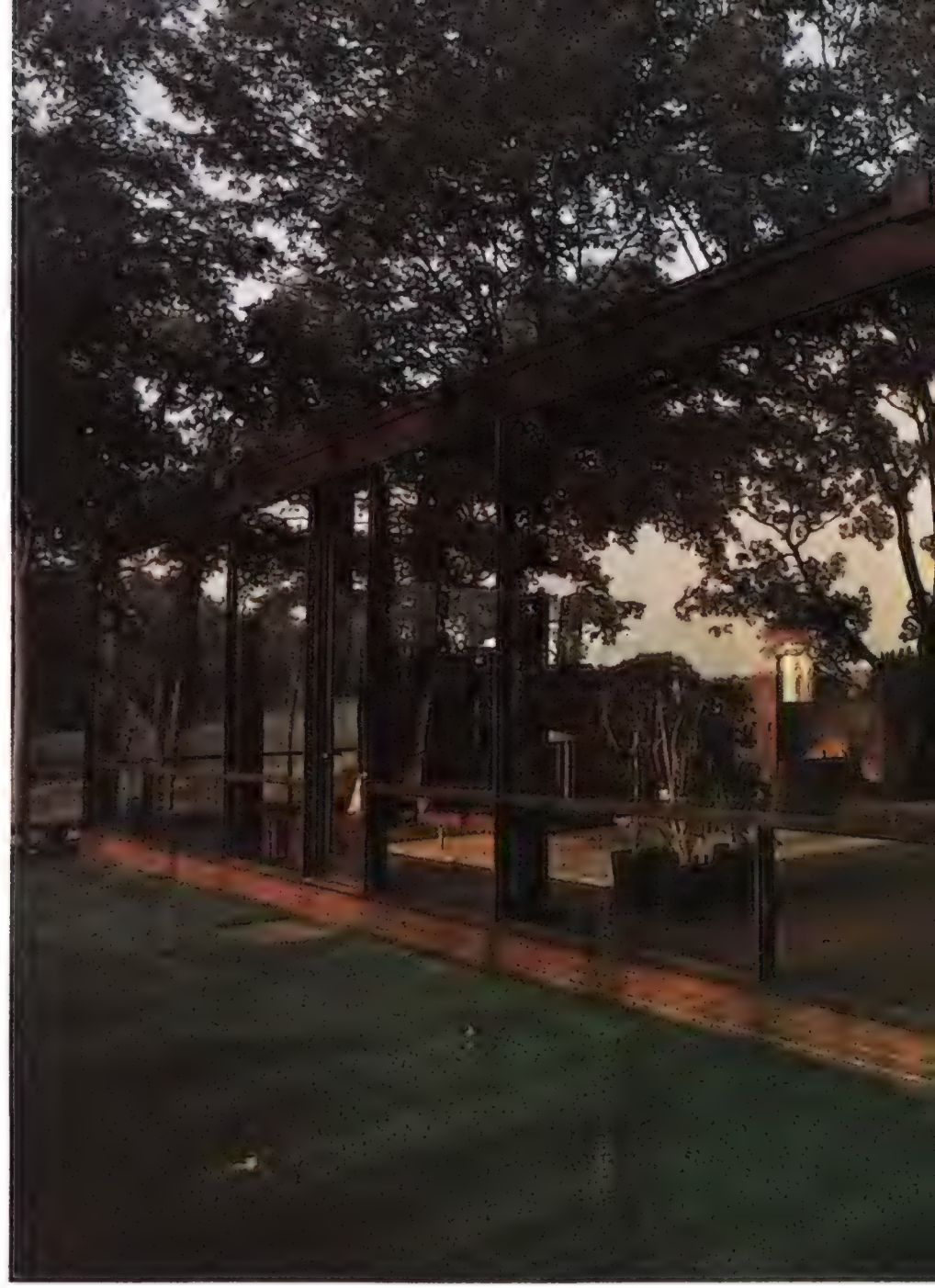
The glass house, 25 years old, is the building which architects and non-architects alike associate with Johnson most quickly, and it remains not only an extraordinary building in itself but as effective a key to his way of thinking about and making architecture as it was when it was built.

Like all of the great houses architects have designed for themselves, Johnson's building in New Canaan had a function far more subtle than that of a proving ground for new ideas. Instead of trying to produce something altogether new (which it was), Johnson took the Miesian approach and continually refined it, not broadening but narrowing the scope until he had what he could consider a perfect object.

The result was a glass box, 56 feet long, with furniture groupings defining the use areas. There are no partitions; only a round brick cylinder containing a bathroom rises to the ceiling.

From inside, the carefully manicured landscape visible through the glass functions as an enclosure, and the ironic illusion is superb: The vistas tell the occupant he is open to the whole world, while in truth there is no world outside at all—just an elegantly arranged landscape that is as much a part of the house

Photographs by Farrell Grehan



Now 25 years old, the glass house continues to attract attention as a contemporary classic of design.

as the furniture. The "real world" toward which the walls of glass beckon is far away and invisible.

Since the glass house was completed, it has grown into a compound of five buildings, and if the house itself is a relic from an earlier era, the overall grouping reflects all of the phases of Johnson's career. The guesthouse, all of brick, is in deliberate counterpoint to the glass house. (Just recently Ellsworth Kelly's *Quarter Arc,* a huge sculpture of rusted steel which is the latest addition to Johnson's impressive collection of contemporary art, was installed nearby, its form itself in counterpoint to the guesthouse.) The lush interior of the guesthouse reflects Johnson's first post-Miesian phase, as does the small, elegant white-columned pavilion by the lake, its unexpectedly small size playing the sort of trick of scale which fascinates and delights Johnson.

Two more recent buildings complete Johnson's estate: his art gallery of 1965 and sculpture gallery of 1970, each of which symbolizes yet another direction. The art gallery is an "underground" building, set into a hill above the glass house. Pictures from Johnson's extensive collection of contemporary art are displayed on panels hung around three circular areas which together make up the gallery space. The panels can be adjusted to change the pictures on display at any one time and, in doing so, redefine the entire room. If the glass house eliminated traditional walls, it at least implied them in the ironic tension it set up between inside and outside; in the art gallery the moving walls constitute what is actually a more radical expression.

The sculpture gallery is a sharply defined, irregular white structure, a sort of angular Guggenheim Museum, with levels stepping downward around a central space, the whole room marvelously tense, all covered with a greenhouselike glass roof.

Taken together, the buildings on his estate at New Canaan are a remarkable group; far more than the ultimate expression of one man's personal taste, they represent an attempt to come to grips, over time, with a variety of notions of what architecture is. They are the result of an agile mind probing, refining, rethinking, from the glass house's explorations within the Miesian vocabulary and ironic interplay of inside and outside, to the art and sculpture galleries' newer, more striking forms and uses of space.

Johnson once delighted in showing guests through the compound, not only to show it off but as an excuse to converse about architecture—which, in spite of the frequency with which he is seen at all sorts of New York gatherings, is the only subject he ever really *wants* to talk about. Now, at age 68, he prefers to spend his weekends more quietly and limits most visits to old friends—although he did open the house and grounds

Paul Goldberger is an architecture critic for the New York Times, *and has written on urban planning for numerous publications.*

Rising in Houston, Pennzoil Place, twin-towered and glass-curtained, contains two vast interior plazas.

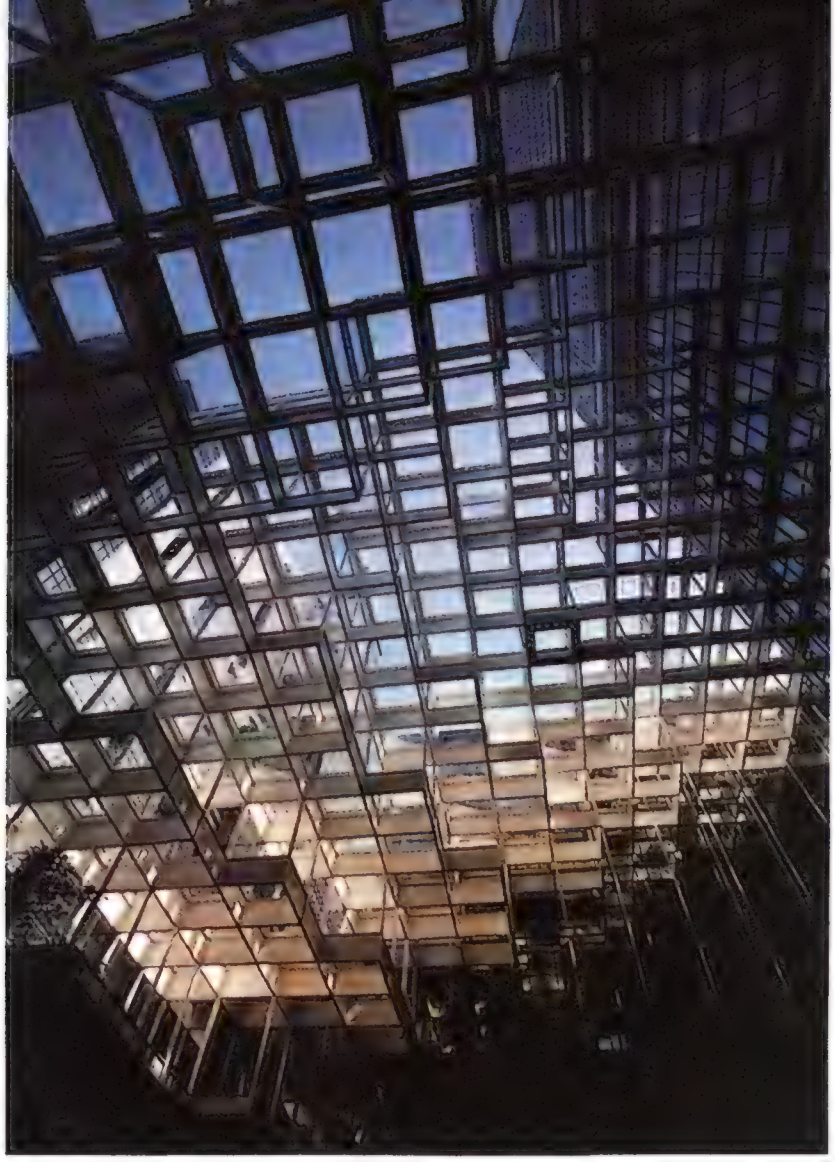
to 225 members of the Architectural League of New York, who came to celebrate the 25th birthday of the glass house.

In another telling observation about Johnson, Vincent Scully once referred to his life as a "continuous seminar on architecture." He holds court at the lunch hour at the same corner table in the bar of the Four Seasons restaurant—another Johnson design—which he has occupied since the restaurant was completed in 1959. And while his guests may be clients ironing out details about a new Johnson project, they are just as likely to be young architects in whose work he has taken an interest, writers on architecture, or old friends who are willing to eschew discussion of politics, the weather and the stock market in favor of architecture talk.

The Four Seasons would be an appropriate place for Johnson to frequent even if he hadn't designed it himself. For Johnson has always lived well, and unlike many architects, he has always been comfortable in the social world as well as the architectural one. His frequent companion in recent months, for example, has been Lee Radziwill, whom he took to President Ford's dinner for Austrian Chancellor Bruno Kreisky last fall. A photograph of Johnson entering the White House appeared in *Women's Wear Daily*, a journal not generally known for its interest in architects' doings.

Johnson first made his reputation as a historian of new architecture—he wrote *The International Style* with Henry-Russell Hitchcock in 1932—and his interest in the latest avant-garde movements has not faltered, although he tends to view them with a more skeptical eye today than he did in the Thirties. But he is remarkably alert to new currents in architecture, and probably knows the work of more young architects than anyone of comparable tenure and stature in the diverse field of design.

Johnson's office, like so many architectural practices, has fluctuated in recent years. Now he and his partner, John Burgee, employ 40 staffers, including four in a small branch office in Houston, a city in which the firm has been extremely active recently.



Hallmark of Johnson's public buildings is light-filled interior space, as in Minneapolis' IDS Center.

The major preoccupation of Johnson/Burgee (they created that name earlier this year after Johnson noticed that the firm's old title, Philip Johnson and John Burgee, was often shortened to omit his partner's name) has been an attempt to vary the form of the skyscraper and integrate it more successfully into its surrounding cityscape.

"We're trying to break the box," Johnson says, "an old preoccupation, but something which has to be done again at the scale of the skyscraper."

Johnson/Burgee has avoided formulas in its major skyscraper projects: Pennzoil Place, now under construction in Houston; Post Oak Central, also for Houston; the completed Investors Diversified Services (IDS) Center in Minneapolis; and Lehman Brothers, a project for lower Manhattan which will not be built, but which was one of the firm's most sensitive designs from an urbanistic standpoint.

But the buildings, while different, share a common approach: They are all glass curtain-wall structures which depart from the box form in one way or another; they all avoid the by-now-cliché plaza in front, usually in favor of a covered interior arcade or court, and they are fairly well scaled and detailed at ground level to relate them to the surrounding buildings. And they are all, in spite of their new shapes and interior public spaces, spiritual descendants of Johnson's and Mies' Seagram Building.

A major Johnson/Burgee skyscraper project, the twin-towered Pennzoil Place under way in downtown Houston, will have the largest amount of office space of any building in the city. It will consist of two 36-story towers, trapezoidal in shape, placed so as to leave two triangular areas open on the site. These are covered with steel-and-glass truss frames which create two vast, greenhouselike spaces—interior plazas which will serve both as lobbies and as urban passageways connecting adjacent streets. It is sensitive urbanism—a building which avoids the stereotype of the isolated tower in an empty space and instead manages to relate naturally to surrounding buildings and street patterns in spite of its large size.

"We are experimenting with shape as much as anything else—doing sculpture, I admit," says Johnson of his current skyscraper series. "I've lost interest in playing all that much with the surface—it's formal variations which interest me most now."

The shape of Pennzoil's towers surely proves that—each has a slanted roof which begins at the 29th floor and continues up sharply to the top, creating probably the only expensive office space in the world designed to look like a garret. That space rented before construction was even started, by the way—and the rest of the building rented so fast that developer Gerald D. Hines prevailed upon Johnson/Burgee to add two floors during the course of construction.

"Hines is fascinated by architecture, which is unusual for a developer," Johnson says. "He is willing to do an expensive building like Pennzoil because he believes that quality can sell. But we've also been playing around with several other ideas with him, trying to create a cheaper, speculative office tower that will still make some sort of architectural statement. That is really our current challenge."

A 51-story octagonal office tower dominates exterior of the full-block IDS Center complex.

Now under construction is Post Oak Central, a Hines building which Johnson/Burgee designed to a strict budget. Here the corners were rounded to provide the formal variation.

The IDS Center in Minneapolis, even less limited in scope than Pennzoil, is a full-block complex including a 51-story office tower, a 19-story hotel, an eight-story office building and a two-story retail wing, all planned around a central glass-roofed court to form Johnson's major completed work to date. The roof of glass-and-steel pyramids mounts toward its southeast corner, reaching 121 feet at its highest point. There are stores around the perimeter, and two of the hotel's restaurants are perched on balconies overlooking the space. It is like a great glass circus tent pitched in the center of the city.

"We took Seagram and we turned it inside out—putting the plaza inside instead of out, and in the center of the site instead of in front," Johnson says of IDS. It is a public space with the dual function of providing civic space and of enhancing the private spaces of the structures for which it provides a processional entrance. But IDS rejects Seagram's symmetry for a playful, active irregularity; diagonals play a major role in the floor plan of the court and of the entire grouping.

The court space has become one of downtown Minneapolis' focal points since its completion a little more than a year ago; as an interior space it can be used year-round in that cold city, and residents are doing just that. It is, really, all a good urban space should be: a clear, processional entrance to the buildings surrounding it, yet an identifiable place in itself; full of life and activity, yet not too busy or fussy; and large enough to create a sense of grand civic scale, yet able to relate well to the existing neighborhood around it.

The office tower itself is basically octagonal in shape, with eight small zigzags along each of the four diagonal sides to provide 32 corner offices on each floor.

The hotel is another building with horizontal zigzags, giving each room a corner window, and the corridors then also have a zigzag effect.

If the form of the skyscraper has been Johnson's most recent preoccupation, an earlier one was the problem of the museum. He has been one of America's most prolific museum designers—beyond the two museum buildings at New Canaan, he has done the new wings and sculpture garden at the Museum of Modern Art; the Museum of Pre-Columbian Art at Dumbarton Oaks, Washington, D.C., and museums in Fort Worth, Utica, New York, and Lincoln, Nebraska. And there are two recent examples of Johnson museum design which reflect his and John Burgee's current formal concerns: the Roy Neuberger Museum at the State University of New York at Purchase and the Museum of South Texas at Corpus Christi.

The Purchase museum is a simple building, a deliberate foil to the complex shapes competing for attention on the Edward L. Barnes-designed campus, intended as an outdoor gallery of modern architecture with buildings by several architects lined up, in the style of Jefferson's University of Virginia, along a central mall. "We behaved ourselves here," Johnson says, "and tried deliberately to leave the architecture for the inside."

Avoiding museum fatigue

The inside obviously does show the architect's hand at work and his interest in processional sequences is especially evident. Several galleries of varying sizes and ceiling heights are arranged, crankshaftlike, along a central axis, a device Johnson believes will alleviate traditional museum fatigue by providing at once varied spatial experiences and a sense of overall unity.

More exciting is the Corpus Christi museum, a pure white object set down at the edge of the Gulf of Mexico. It is sharp and crisp, recalling the angular sculpture gallery at New Canaan as much as any other Johnson building.

The interior contains three exhibit galleries, all different and all superb spaces in themselves.

Natural light is a major architectural element here, manipulated with more daring than Johnson has ever before used. Light washes down the white walls from clerestory windows, and one enormous square picture window frames the scene out in the Gulf, freezing the movement of the passing boats and rendering the ordinary scene of Gulf traffic something extraordinary by turning it into one of the museum's pictures.

Some time ago Johnson told an interviewer that "the only thing of any importance is beauty." He does not seem to see things quite so simply now; his alert mind, which seems to become more rather than less open to new ideas as time goes on, has pushed him in new directions, far away from the old identity of *"l'architecte du roi,"* which he for so long had in New York circles. Much has happened in Philip Johnson's career since the day in the early 1950s when he told a startled college audience that "I would rather sleep in Chartres Cathedral with the nearest john two blocks away than in a Harvard house with back-to-back bathrooms"—a statement that in the pragmatic Fifties shocked a lot of students who had not encountered a man who believed that architecture was an art before it was anything else.

He hasn't rejected all of that, but just seems to have gone beyond it to take in a lot more at the same time: urbanistic concerns, new formal approaches, the developers' strictures which he once scorned and is now fascinated by the problem of learning to work with.

It is all, he now says, part of architecture—which is still, to Philip Johnson, a field of "wonderful freedom, of endless possibilities."

Reaching 121 feet at its highest point, a roof of glass and steel soars over heart of IDS Center, the courtyard.

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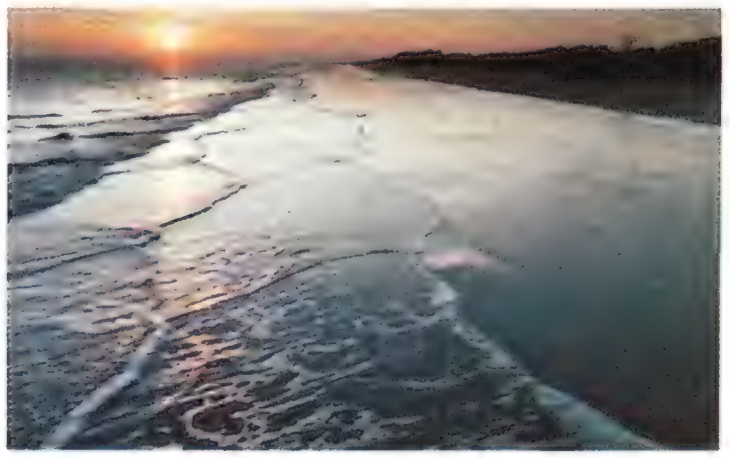

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Seen from the Everest View Hotel high up in Nepal's new Khumbu national park, the 21,730-foot peak of Tamserku Mountain briefly catches the fire from the last rays of the Himalayan autumn sun.

Photographs by George Silk

Spectacles abound in Nepal's two new national parks

A photographic journey to this Himalayan kingdom's wildest areas captures their extraordinary beauty—but where are tigers?

Probably the largest of Himalayan birds, a griffon vulture spreads nine-foot wingspan to take off.

Sandwiched between India and Tibet, Nepal is a small kingdom, only 500 miles long and about 100 miles wide. It now possesses, in the Khumbu area, the most spectacular national park in the world, for it includes in its borders the Mother Goddess of the Snow—Mount Everest. The Mount Everest National Park became an actuality in late 1973 along with Chitawan, a low-lying area in the south, the home of endangered tigers and rhinoceroses. Langtang, an area where lush rain forests cling to the slopes of 25,000-foot peaks, is still under consideration as a national park.

My wife Margery and I journeyed to these places, timing our arrival in mid-September to miss the monsoons, and heading first for the high Khumbu country before it got too cold for camping.

We flew to Lukla (9,000 feet) and met our headman, Dorjee, who quickly loaded the equipment and supplies onto yaks and several pretty Sherpa girls, who turned out to be our porters. For three weeks I was embarrassed every time I glanced at them carrying my gear, but they just grinned back at me.

Our first destination was the new Mount Everest View Hotel, where we were to rendezvous with the rest of our party. It was a two days' hike for us and a climb to 13,000 feet, and we were very much aware of our headman's scrutiny as he summed up our capabilities.

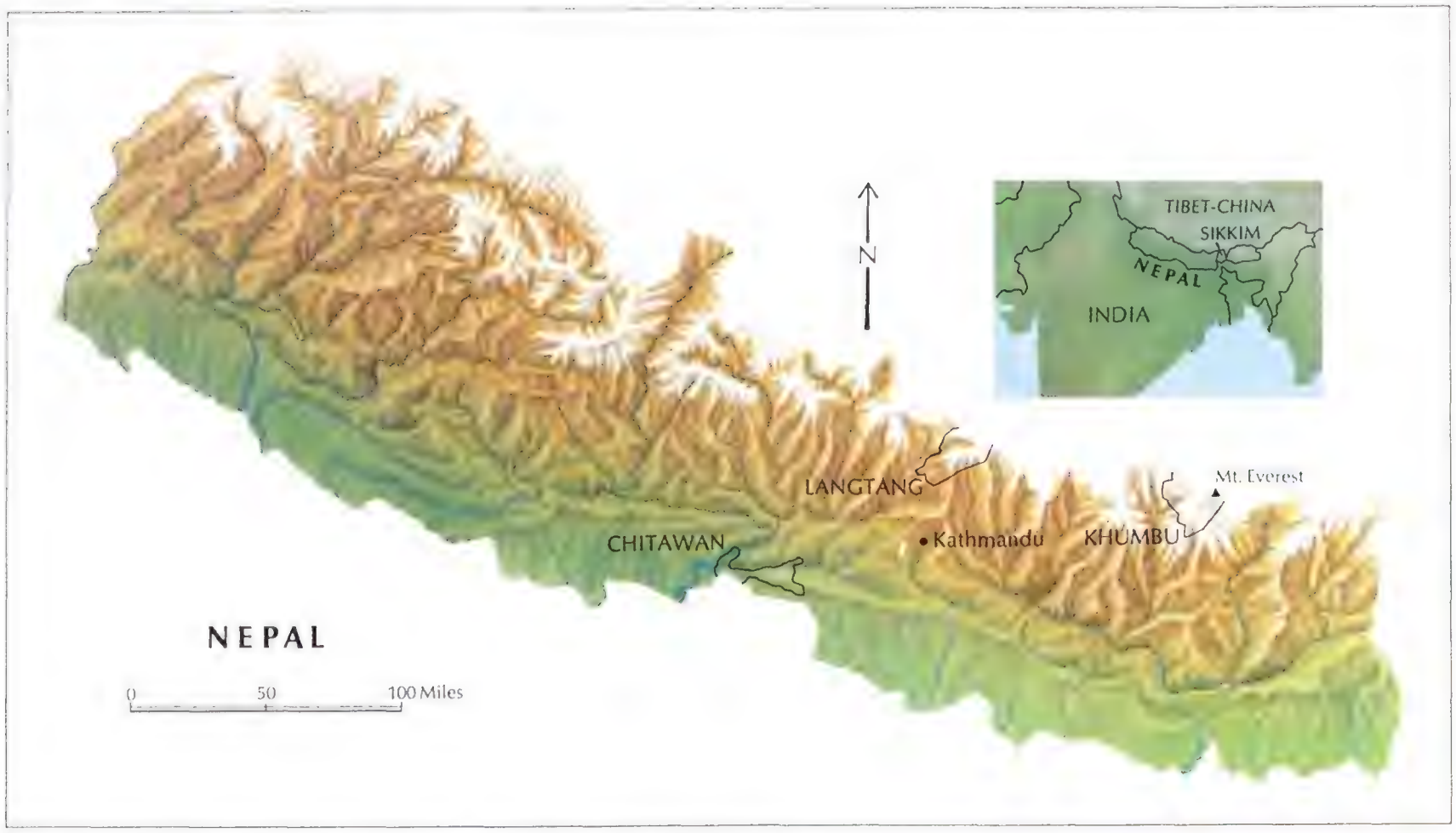
The trail got steeper and steeper, and in places where the rain had gouged the track we slipped backward almost as much as we gained. At about 12,500 feet a clammy fog rolled in. But as we breasted the final rise, the clouds cleared away and we saw the hotel.

In the morning a helicopter brought Dr. Robert Fleming, an American ornithologist who had agreed to guide and help us. The next day we trekked through a north-facing moist dell, a natural garden of moss-covered rock and lichen-dripping trees. It was difficult to believe that we were at 12,500 feet. We emerged from this fairyland forest into the harsh stubble-covered fields of Khumjung, all the fields carefully outlined by countless stone walls. Like showers of snow, large flocks of snow pigeons swirled and landed as they gleaned what was left of the barley harvest.

Beyond Khumjung we joined the ancient trail along the Bhote Khosi River, used for centuries by traders to cross the 19,050-foot Nangpa La Pass to Tibet. The trail clings precariously to sheer rock faces and ceaselessly loops around gorges where feeder streams hurl themselves into the Bhote Kosi. Groves of the soft-leafed blue pine (*Pinus excelsa*) and Himalayan fir (*Abies spectabilis*) cover the slopes, but most of the branches have been carefully stripped for firewood, leaving only a tuft of green at the top.

We baited a rock with goat meat to attract the great scavenging lammergeier and Himalayan griffon vultures. These huge birds have wingspans up to nine-

Text by George Silk, with Margery Silk



In only 150 miles you go from the top of the world, Mount Everest, to the jungle lowlands of Chitawan, both of which are in new national parks in Nepal, the small Himalayan state sandwiched between the two great Asian giants, India and China. Handy to Kathmandu, Langtang is also a possible park.

and-a-half and ten feet, respectively, and their legs are covered with feathers which protect them against the Himalayan cold. The lammergeier soars effortlessly for miles in search of food, and climbers have reported seeing them at 27,000 feet on Mount Everest.

The shadow of a lammergeier brushed silently over me as it glided in to investigate the ruckus which the crows were making around the entrails. The crows had discovered the meat in seconds, the first lammergeier within a minute. In five or six minutes the meat was gone, devoured by a dozen scrapping griffons who had plunged from the sky. High overhead, two golden eagles briefly investigated, while five or six lammergeiers circled close by waiting to get at the bones.

Several days later, we found an idyllic campsite in a yak meadow below Khumjung, with Tamserku Mountain looming over us. In the evening, Himalayan pheasants (see cover) called loudly as they swooped from boulder to boulder about us. They fly by at terrific speed, a flash of iridescence. The Nepalis call them the nine-colored bird. They are heavily hunted and trapped and very shy, but, since their designation as the national bird of Nepal, a serious effort is being made to protect them.

Rain and two days of heavy falling snow trapped us in our meadow. The rumble of avalanches rolled around the valley steadily, and our hopes of getting to base camp at Everest evaporated. We did stumble through the snow as far as Thyangboche, but were warned by government officials that it was not advisable to go farther. We returned to Kathmandu.

Our next destination was Langtang, a superb area for a park because of its easy accessibility for tourists and residents of Kathmandu. Enormous tracts of uncut climax forest are preserved here because they belong to the Chini Lama.

Our guide, a local hunter wearing the fearsome curved kukri knife in his belt, led us up trail-less steep slopes through moss-dripping giant oak (*Quercus semicarpifolia*) and hemlock (*Tsuga dumosa*) trees. There are a few small red pandas here, he told us, but they are nocturnal and he doubted if we would see any. Bears? Forget it. The langur monkeys, however, should be no problem.

We made contact right away with a troop of monkeys as they prepared to cross a stream. A mature male cased the area and cautiously descended from the treetops. On the ground he was as silent and watchful as a Hatfield in McCoy territory. Once he was safely across, the troop followed at carefully spaced intervals, the females and juveniles first. Guarding the rear was a very big male. The efficient maneuver reminded me

of a platoon of infantry on patrol. Once across the stream they vanished quickly through the treetops.

We caught up with the same troop the next day during their noonday nap. Two males were squatting on the limb of a hemlock tree guarding the rest of the well-hidden troop. We stayed perfectly still watching them: Their heads slowly sank as they dosed, only to snap erect again after a few seconds for an anxious look around. When it was time to return to Kathmandu, we had still seen no red pandas.

In a nest of tigers

It is a 75-mile downhill flight from Kathmandu to Chitawan, some of which is only 500 feet above sea level. The once-a-day plane landed on a grass runway which was soon reclaimed by hundreds of scrawny cattle and buffalo. A two-hour elephant ride through jungle and high wetland grass delivered us to Tiger Tops Hotel. Peafowl flew around us, their gorgeous tails streaming, and in a clearing chital (spotted deer) lifted their heads and scampered away. In the river a large mugger (a marsh crocodile) sank slowly from sight and an armor-plated rhinoceros lowered his head warning us not to come closer. We didn't.

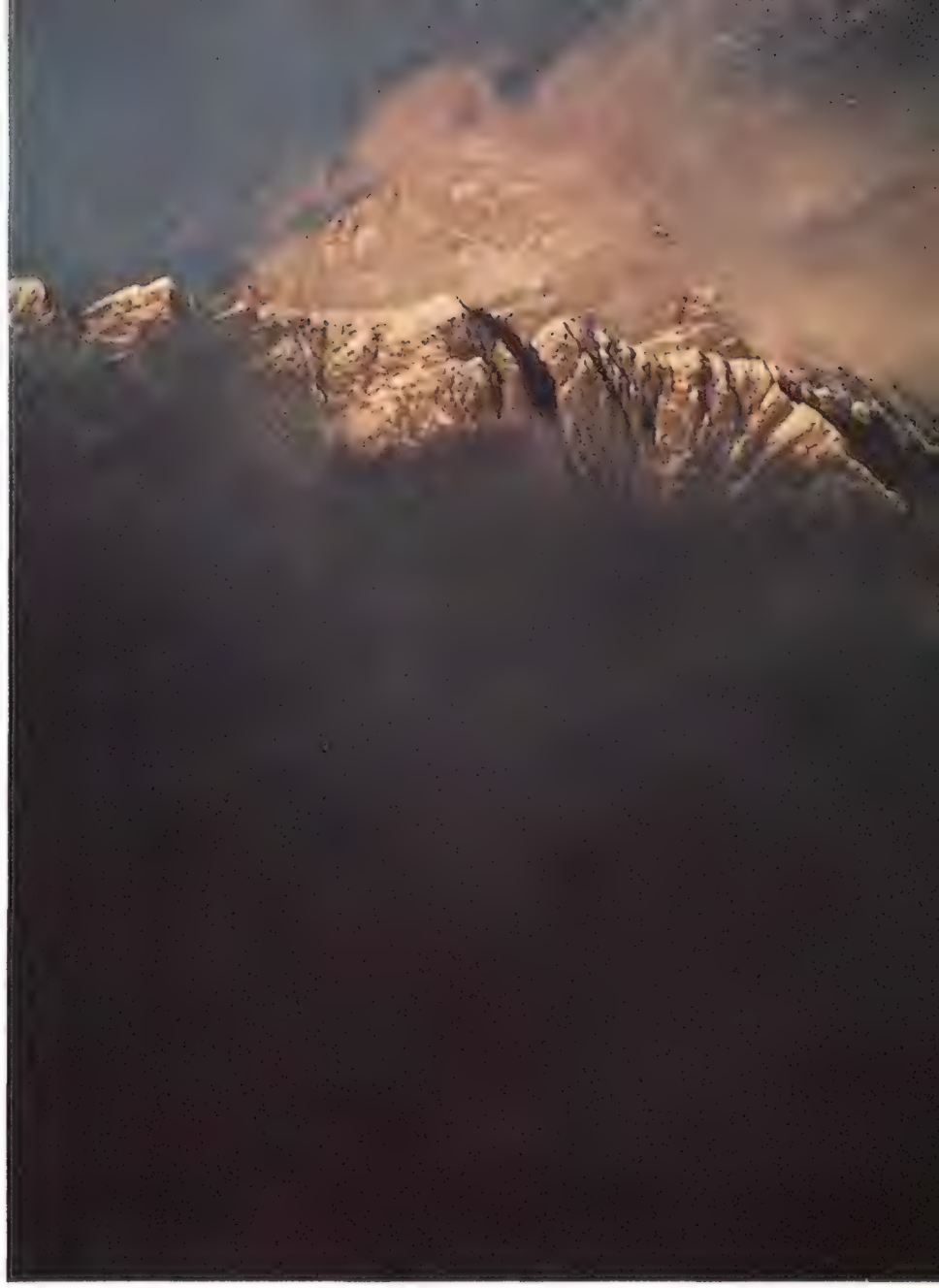
Chitawan is a refuge for two of the world's most endangered animals, the Bengal tiger and the great Indian one-horned rhinoceros. The 120 or so rhinos in this sanctuary (there are only 500 to 800 in the world) have been protected since 1962 by armed government guards who have orders to shoot poachers on sight. The rhinos are now increasing.

One of the greatest threats to Chitawan is the cattle from the villages. Since they are considered sacred and never killed, they multiply alarmingly. Fodder is scarce, and the cattle are encouraged illegally to cross the river and to feed in the refuge, where they quickly destroy the wetland grasses essential for the rhinoceroses' habitat.

Once famed for its tigers, Chitawan was a royal hunting preserve until a few years ago. On a royal hunt, two or three hundred elephants and several hundred beaters would drive the tigers into an ever-decreasing circle where they were shot. Paintings of the great hunts show desperate tigers clawing their way out of the circle over the backs of terrified elephants.

Our host, Dr. Chuck McDougal, had made extensive preparations before my arrival to help me photograph the tigers. Two machans (blinds) were built ten miles apart and baited regularly with buffalo. The plan called for me to be in the machan by 3:30 in the afternoon each day and not leave again until 8:00 the following morning.

The jungle was astonishingly quiet in the late afternoon, almost as though it were listening for something.



Mother Goddess of the Snow, Mount Everest, looms behind clouds that are just beginning to break up.

On the Narayani River, the renowned photographer George Silk and his wife, Margery, celebrated their 25th wedding anniversary in the rain with a single bottle of champagne. Several other photographs of Nepal by Mr. Silk appear in the 1975 Time-Life *Nature/Science Annual.*

Like small blizzards, snow pigeons swirl in tight flocks under the peaks in Khumbu's national park.

A Himalayan tahr—a fat old bull of some 200 pounds —heads for his rocky ledge and a morning snooze.

Head down, looking for food, a lammergeier soars silently between mountain peaks like a sailplane.

When the quiet was broken by the alarm calls of chattering birds or the barking of deer, my senses tensed but whatever upset them was hidden from me.

On the sixth night, I was kept awake by a tiny visitor in the machan. I was starting to doze when my ear was gently nibbled. Sleep after that was impossible, for the creature constantly scampered over me, stopping now and then to sniff my face. The little animal did not bother me half as much as the thought that a snake hearing it might come slithering in. Eventually I did go to sleep, probably just before dawn, and woke only when Chuck arrived at 8 A.M.

"Did you get pictures?" he asked suspiciously as he watched me rub the sleep out of my eyes. On investigation, we found the bait almost completely devoured and the tracks of not one, but two tigers. I had blown it because of a stupid mouse.

The next day we went down the river to the other machan. Our campsite on a gravel bar in the Narayani River 500 yards away from the forest edge was selected to cause the least disturbance to passing tigers.

After several days at the machan and no sign of the tigers, I was discouraged. Chuck, the experienced hunter, was not. "Each animal has his own territory," he explained, "and it could take two weeks for them to make their rounds. Of course," he casually added, "you could lure one here sooner if you hire a guruva."

I stoked the fire, poured another Kukri rum and said, "You mean a medicine man, magic?"

"Call it what you like," said Chuck, "but it's standard operating procedure when tiger hunting."

Soon word was on its way to the villages at the edge

An old Sherpa porter treks up a mountain trail bearing what appears to be more than his own weight.

One langur monkey dozes while another stands watch in the dense rain forest of mountainous Langtang.

A gavial crocodile lurks in the shallows of the Narayani River. They grow from 12 to 15 feet long.

Sacred cattle and buffalo graze near the airport where once a day a plane brings Chitawan visitors.

A cook produces mostly smoke as he attempts to prepare food and boil tea in the rain at Langtang.

During the daytime, fruit bats hang (appropriately) like fruit from a tree in downtown Kathmandu.

of the jungle, and the next day an old man of great dignity appeared with two worshipful assistants. He squatted by the fire and in his native dialect discussed the situation in great detail with Chuck. He was Bale Ram Gurau, the most powerful guruva in the district. He warned that there are not many tigers but thought he could help. Money? Not even to be discussed until the puja (the tiger-attracting ceremony) works, he says. No tiger, no money. I was impressed.

After a couple of hours Bale Ram Gurau and his acolytes moved a hundred yards away from camp and I saw them pottering about stirring the contents of a small tin can. Thinking that they were preparing a meal I took little notice; Chuck later told me that what I had seen was the puja ceremony.

Two days after the guruva left, a tiger was heard in the jungle and that news had us out of bed early the next morning. We usually waited for the first streaks of dawn before entering the jungle, but now there was no holding Chuck. We plunged into the dark. Every twig under foot had me sweating, for the thought of snakes turns me into jelly. To keep the noise down Chuck waited while I crept on alone the last 75 yards to the machan. After a couple of minutes he would silently join me. As I bent over to ease myself into the hole, a shattering explosion of noise petrified my senses. The tiger had roared.

Chuck slid in beside me and we waited tense and impatient for the dawn light to penetrate the jungle canopy. When another roar shook the machan, Chuck

pointed to the grass to the right indicating the tiger was resting there. For an hour we listened, but when the growls and the "aoah's" faded up the ravine Chuck shook his head, and we left. The tiger had gone looking for a place in which to lie up for the day.

"It's a female in heat," Chuck told me as we walked back to the river, "and she's calling up a mate. When she finds one, she's almost certain to return because she knows there's an easy kill here."

Chuck left to attend to business in Kathmandu. While he was away, I followed the usual routine of spending several hours at the machan each night and morning. Every night in camp we were awakened by the tigress' roars as she roamed the jungle looking for a mate. On the morning following the fourth night of caterwauling, I approached the machan even more carefully than usual, for I had a feeling the tiger was there. Sure enough, as soon as it brightened I could see that the bait had been nibbled. My blood was racing, but I kept still, hoping that she was resting and would return for a snack before leaving.

Half an hour passed before the first rumbling growl revealed that she was indeed close by. As I searched the long grass with my telephoto lens the growling became more frequent and was punctuated by ear-splitting roars. There were two tigers, and although I couldn't see them I had to presume that they were mating. It sounded to me more like a fight to the death.

The mating continued until midday when the pair drifted away up the ravine, whispering to each other in low moans. I left the machan frustrated and exhausted, having had not one glimpse of them.

The next day was a repeat performance, and on the third day after listening to them thrashing around for a couple of hours, I left the machan to try to find a place where I could see them. I crept along the cliff, climbed a tree and in desperation went over the bank into the ravine. A throaty growl stopped me after only a few steps into the elephant grass, and it took but a moment to reconnect my brain and retreat.

As we now had run out of bait for the tigers, we broke camp. That night, while we were finishing dinner, the tracker appeared and told us that the tigers were still mating.

I groaned, but felt I should give it one more try. The equipment was sent back to the camp during the night, while I got a good night's sleep.

The next day, heading for the machan, we overshot the campsite in the fog and arrived a day later, amidst alarms and search parties. While we were having coffee the tracker informed us that the tigers had left so we packed up again and climbed on the elephants. On the way a bottle of Scotch was produced and as I sipped it atop the swaying beast, slightly dazed by all that had happened, it crossed my mind that although I had no tiger pictures, I probably did have enough misadventures to write a book someday which might be titled *Drunk on an Elephant*.

A rhino mother and calf, killed so that the horn, considered a powerful aphrodisiac, could be taken.

Pug marks of a female tiger mingle with a human footprint; this is as close as author got to tigers.

THE WHITE HOUSE HISTORICAL ASSOCIATION

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SMITHSONIAN

By Rudolph Chelminski

West Germans screw up courage to show Nazi art

Current exhibit of Hitler-sponsored works reveals a grim vista of 'strength through joy' in fierce-eyed allegories, awkward nudes

Photographs by Pierre Boulat

Frederick the Great at Kunersdorf depicts a Prussian defeat in 1759. This cartoon, painted by Werner Peiner, Goering's favorite artist, was for a ten-meter tapestry—never made.

At precisely six o'clock in the morning of June 27, 1940, Arno Breker was awakened in his Berlin apartment by an official phone call. It was from Gestapo headquarters. "We will be coming to pick you up at seven o'clock," the voice told him briskly. "Be ready."

Breker stammered out a timorous "What for?" But the brief answer did him no good: "That is secret."

Confused and apprehensive, he made himself ready. As far as he knew, he had nothing to fear from the Gestapo. He was neither Jewish nor communist nor oppositionist. He was a successful, 40-year-old sculptor with a penchant for classical form and monumental work, a former student of Aristide Maillol and an habitué of the Montparnasse of the late Twenties. He

had even done some work for the government, including a bust of Hitler. But now?

At seven, two big troopers were at his door. They escorted him to a Mercedes parked outside, planted him behind the driver and drove off, not deigning even to acknowledge his questions. It seemed clear they had instructions to maintain silence. They headed straight to the airport, where a military cargo plane was already warming its engines. After the plane was airborne, Breker tried to make conversation with the soldiers in the canvas bucket seats next to him, but they, too, answered only with grunts and shrugs.

About two hours later the plane glided down to a landing on a grass field. Breker had no idea where he was, but there was another military car waiting for him. By now he knew enough to keep quiet as they drove into a little farm village, Brûly-de-Pesche. Then he realized where he was. Brûly was Hitler's headquarters for the French campaign, just north of the Belgian border near Charleroi. As the car stopped he recognized many of the faces crowding around, all laughing heartily: Speer, Keitel, Bormann. The silent mission had been their idea of a joke.

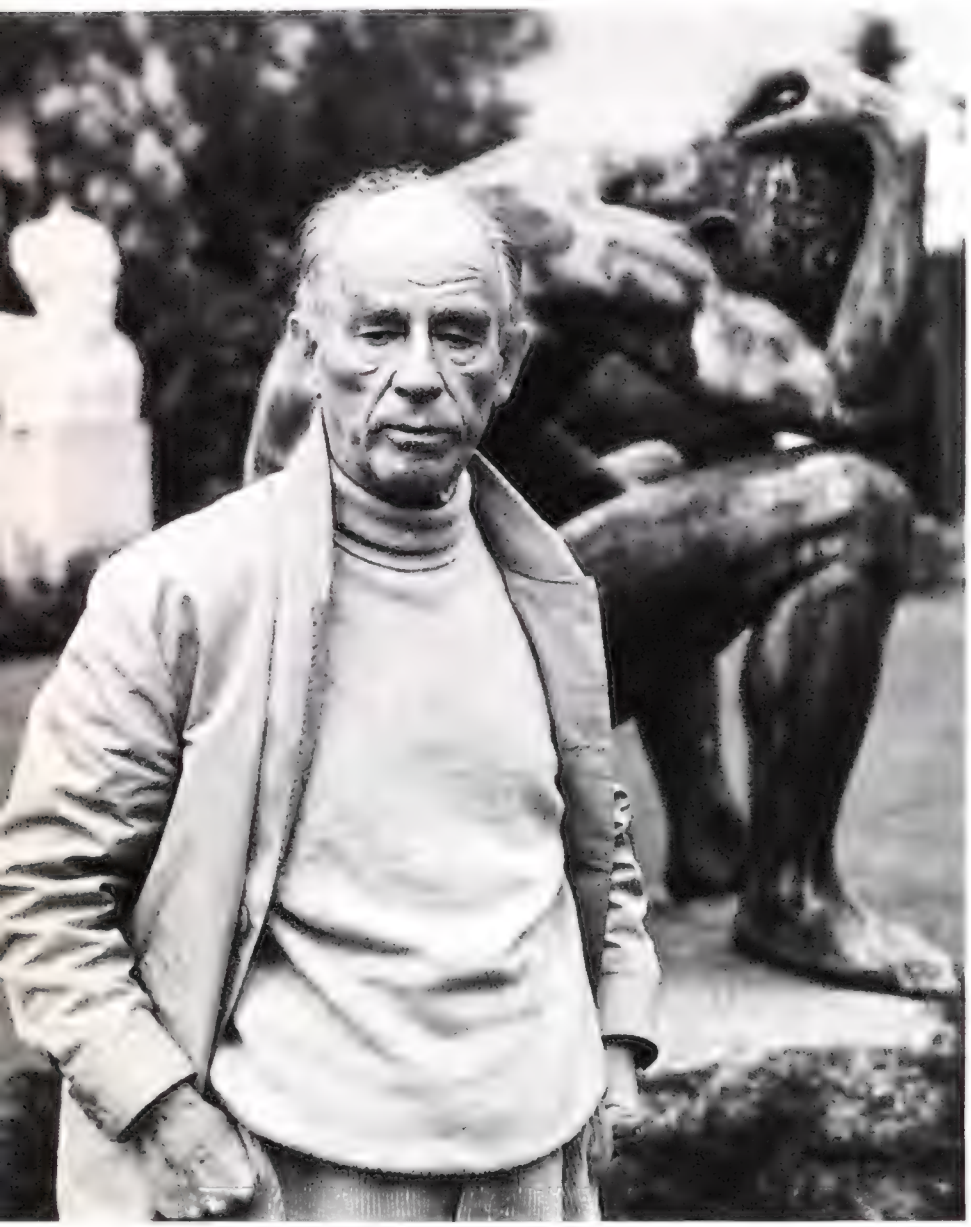
It was an easy time for Germans to laugh. Two days earlier the armistice had come into effect and France lay vanquished at their feet. Now Hitler had decided to fulfill a lifelong dream by visiting Paris. He had chosen Breker to be his guide.

It was to be the Führer's only visit to the City of Lights. Characteristically enough, the lightning conqueror chose to take his prize not like a warlord but rather like a nervous student. What he wanted was not an act of submission (that had already been accomplished) but a chance to visit the works of art which he had studied so assiduously in Vienna and Munich and Berlin. This was why he had called in Breker, artist and one-time Parisian. Three hours the next morning, from six to nine, was all he needed; then it was back to Berlin to plan the Soviet campaign.

This weird Cook's tour through the empty city was striking proof of the importance which Hitler—and hence his cronies—attached to art. Since 1933 he and a few of the powerful figures around him—Goebbels, Goering, Speer and Alfred Rosenberg, the National Socialist ideologue—had been fostering the artistic style which they considered proper for the New Germany, and by now it was in full bloom. What is left of it today is virtually a state secret, hidden away in guarded storerooms like a strain of bacillus. But *then*! Then it was the ultimate arm, the secret weapon which would bring a beauty to Germany such as no other nation had ever known.

Art was heavily subsidized during the Third Reich. Its mission was to express the goals of the new order, mirror its accomplishments and create satisfactory ideals. State-paid projects ran from oils and temperas and tapestries to gargantuan constructions (the autobahns and their bridges; the Great Hall of the projected Reich headquarters, designed to be the biggest assembly hall in the world) and suitably imposing statuary and mosaics to decorate them. While the rest of the Western world continued with the postimpressionist "isms," the Third Reich turned its back on this "decadence" and wandered into a bizarre backwater more to the liking of the men who counted. Naturally, this drove many of the country's most creative forces to follow George Grosz and Max Beckmann into exile, but many lesser ones stayed behind and worked as best they could. For some of these it meant disgrace and oblivion; for others some pretty giddy moments of personal and professional satisfaction.

Most of the art of the Third Reich was, of course,



Arno Breker, Hitler's pet sculptor, cannot now sell the bronzes in his garden. Some recall Rodin.

Mr. Chelminski wrote the article on European spas last August. Mr. Boulat's photographs of Notre-Dame-des-Fontaines appeared last April.

Fleshy Venus and Aryan Adonis were painted in 1939 by lesser known Arthur Kampf, supposedly after Titian. Many nudes were rather skinny, perhaps to emphasize their dependence on Nazi males.

destroyed when the final cataclysm rolled over the land in 1945. As one of the most visible exterior signs of the detested regime, it suffered heavily from pillaging, vandalism and souvenir-hunting as well as the usual damages of wartime. Arno Breker lost all but a fraction of ten years' work: First, an Allied bomb fell directly into his Berlin studio; then, six months after the war had ended, American occupation troops discovered the warehouse where he had gathered together his completed statuary. They made space by smashing the figures to bits and piling up the remains in a corner, like a surrealist boneyard. Werner Peiner, one of the period's most famous painters, spent six years making the full-size master paintings for the tapestries which were meant to cover 150 feet of hallway in the new chancellery building. All of them have disappeared. Peiner consoles himself with the color sketches (pp. 70-71, 74, 79) that he brought for Hitler's approval.

Yet a great deal of the art made it through the war. The amazing output—Germans work hard, whether they are machinists or artists—has left some 600 pieces to posterity. In a warehouse under the jurisdiction of the Finance Ministry in Munich, they are duly catalogued as government property and kept from the public. Successive governments have found no better solution than to keep them locked up. No one wants to be accused of favoring a rebirth of Nazi sentiment.

The hidden "treasure," if such it can be called, was recently rediscovered by the French photographer Pierre Boulat, who, through a combination of personal contacts, persistence and luck, finally received permission to photograph a large selection.

It was a momentous event when the ministry door swung open a crack last October and allowed out a few selected works for the first postwar public viewing. The setting was the Frankfurt Art Association and the force behind the show, which will be shown in Hamburg, Stuttgart, Ludwigshafen and Wuppertal until July 30, was its young director, Dr. Georg Bussmann.

"Our interest is not so much to show art," he said, "as to demonstrate the function of that particular art. The reason for this show is to bring back an idea of what life was then, and what the ideology was. People tend to forget. We want to make them understand what fascism was and make it impossible for it to return. It is in the art that the spiritual submission of Nazi times comes across the most clearly."

Fearful of criticism from the left, Dr. Bussmann took laborious pains to keep the show thin (26 paintings and some sculpture spread over three floors), and to surround each piece with detailed "rebuttals" consisting of historical explanations, statistics of Nazi atrocities and other critical commentary. Predictably, the far Left did demonstrate, but the general public

Werner Peiner, still doing well, stands beside his *Pandora* in his 13th century castle, complete with drawbridge and moat, near Cologne.

Winter night above Königshütte by Domnich shows wartime factories lighting the night sky.

reacted precisely as it would to a classroom lesson. People shuffled through silently, dutifully reading what they were supposed to read. The only sign of emotion came in front of the first bust of Hitler to be shown for more than a generation. Almost everyone gave it a wide berth.

Peiner and Breker, the two most important survivors of the Reich's artistic backwater, were both well represented in Bussmann's show, but neither had been consulted or invited. Bussmann had come to bury, not to praise them. Such social and professional ostracism has been the constant companion of both men since the end of the war, in spite of their assertions that they never had anything to do with politics.

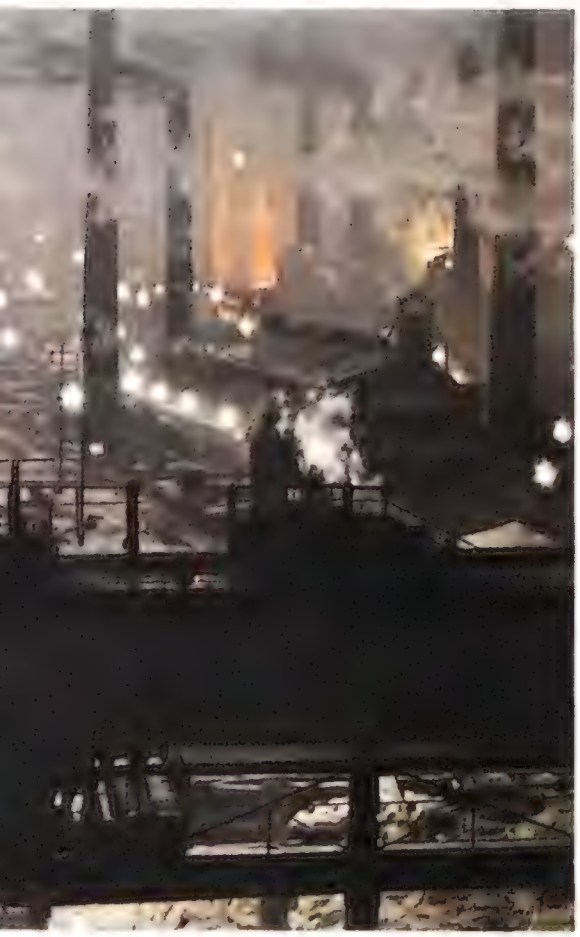
"I am writing a book to be called *Thirty Years of Defamation*," Breker told me in his Düsseldorf studio, which sits at the very end of the airport runway. His bitterness was punctuated and occasionally drowned out by the thunder of jets taking off. "All the political parties pick on me. I can't sell. I can't expose my work. Papers won't review me. They demolish me as soon as my name comes up."

In his immaculately kept garden, huge bronzes of clean-profiled Aryan youths strike heroic poses at each other. These had been stored in Paris, and he was able to recover them after the war. One of them, a perfectly muscled Siegfried, stands without arms. "Your American compatriots cut them off," he drawls. "Put *that* in your article."

Peiner, now 77, lives with his wife, Maria Theresa, in a beautiful 13th-century fortified castle on a hillside near Cologne, protected by two gates, a drawbridge and a waterless moat. Peiner is proud to say that he paid for it entirely through postwar private sales, mostly in Germany and South Africa. Like all artists patronized by the Nazis, his style is bright, representational and free from interpretations or caprices. He works only in tempera. For him the big time began in 1937, when he was running his own art school in Kronenburg. He recalls the moment with excitement and nostalgia. The summons came in the form of a telegram, as imperative and brusque as Breker's phone call from the Gestapo: "Come see me in Berlin," it read. It was signed: "Goering."

"When I got to Berlin," Peiner recalls, "he asked me to do a portrait of his wife, but I had to tell him that I never did portraits. All right, Goering said, then do me a painting for our bedroom."

Goering gave no precise directions, but Peiner made an intelligent guess and decided to go with the neoclassical allegory so much in favor with the Nazis and to give it a touch of genteel eroticism for Goering himself. He quickly produced two large paintings, one of Europa and the bull and the other of Leda and



Farmer's family of Kahlenberg by Wissel depicts rustic German life under the New Order, with healthy subjects of the Führer.

the swan. Goering chose Europa with delighted enthusiasm. Peiner's future was assured. He still has the Leda today—above his bed in the castle.

Goering's appetite was apparently boundless. His projects were vast—for example, eight huge tapestries for his library. Peiner chose the stately theme of the eight classical planets (excluding Pluto), represented as gods rolling in their chariots to their heavenly duties. The Reichsmarschall left Peiner to his inspiration.

"Do what you wish," he ordered peremptorily, "but make it beautiful."

Peiner's paintings for the tapestries were so successful that he never had a chance to see the job through to completion. Hitler decided *he* wanted monumental tapestries for the great hall of the new chancellery building. "Speer told Hitler I was the right one for the tapestries. Hitler agreed at once and Speer called me in to tell me what an honor it was. He said it was the greatest task ever given to an artist in the Third Reich. I proposed as a theme the great battles of German history and we chose eight, beginning with the defeat of the Romans by the German chief Arminius and ending with World War II, to be chosen later."

"They let me do exactly as I liked," he insists. "And to think that people say there was no artistic freedom in the Third Reich!"

Until war broke out, the art of the Third Reich was pretty much limited to four basic themes: classical allegories, landscapes, agricultural or industrial scenes proclaiming the good life of honest, Aryan Germany and, of course, nudes. Curiously, voluptuous Brunhilds occurred hardly at all. Rather, the Nazi nudes were painfully "true-to-life," often flawed and awkward. "They liked to show woman as weak and subjected to man," Dr. Bussmann said.

After 1939 a fifth subject became the "task" for artists: war and the military. "The same painters who had been doing cows and pastoral scenes," Hinz explains, "now turned to tanks and dive bombers. Also the dirigisme from above became far stronger than in peacetime. Many skillful painters saw in the war a chance to become famous by turning their talents to the military."

"Hitler was interested in art," recalls Peiner, "so all the leaders of the Reich wanted to have the same interests, but I would say that Goering was the only one besides the Führer who had any real knowledge. Museum directors trembled when he showed up."

Visitor at the Nazi art exhibition gingerly touches the face of Hitler—a bust most people avoid.

Political perils for Breker

If Peiner felt well-protected, Arno Breker had a far riskier time of it at first, but eventually he worked his way up to the best guardian angel of all—Hitler himself. Breker returned from Paris to Berlin with the advent of the Nazis, but for years he found himself cut off from the lucrative new government orders which were bringing work to hundreds of artists. He later learned that it was because of his suspicious ten-year foreign residence and his many Jewish clients. When in 1935 he presented himself at the Ministry of Education to complain, he met only with vague evasions. "They told me I could do a bust of Hitler if I wanted, but the pay would only be 600 marks including the price of the casting and I would have to do it without Hitler posing for me!"

Breker ingeniously solved his problem by hanging around the Kaiserhof Hotel, where Hitler used to take coffee every afternoon with his cronies. He was never able to get closer than 25 or 30 feet, but it was enough for him to make at least rough sketches. After this modest beginning he entered a sculpture competition for the 1936 Olympic Games and won second prize in the anonymous judging. Hitler himself presented it.

"Ah, Breker," he said, remembering the models he had seen, "You're the one who works in the style of the Greeks."

"No, mein Führer," Breker shot back without thinking. "I work directly from nature."

Hitler, Breker recalls, turned on his heel and left the room without further comment. In 1938, through Speer, he won a contract for two statues to guard the official entry of the new chancellery building. By now it was clear that Hitler admired the style of his work, but it was not until 1940, with the Paris trip, that he knew that he had been rehabilitated.

"The evening after our visit we all had dinner together in the headquarters. Afterward, when we were

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taking the usual constitutional, Hitler came over and said, 'Breker, I want to talk to you.' We walked perhaps 150 paces toward the forest until we were out of sight of the others. Then he took my right hand in his two hands and said, 'Breker, I have to apologize for what's been done to you up to now. For years I've had a dossier on you that calls you every bad name under the sun. If you're not a homosexual, then you're a pimp or a communist. All of this came in from denunciations. Today I can see that they are all lies. I have given Bormann the order to arrest the next person who dares denounce you.' "

Breker was launched. As Hitler's favorite sculptor he received a fat contract and a dizzying series of orders which culminated with his being given entire responsibility for all the sculpture in Berlin. And he came within a hair of going even higher.

"In 1943 Hitler called me into the chancellery and asked me if I would like to be in charge of the arts for all of Germany! I was so astonished that I could hardly talk, but I asked him for a week to think it over. When I came back I had written down 14 conditions for taking the job. And the very first one was that Hoffmann be removed from all his responsibilities."

Heinrich Hoffmann, Hitler's personal photographer, seems to have inspired unanimous distrust. Speer describes him as a tasteless, drunken lout, but not even he was able to remove Hoffmann. If not the intellectual *éminence grise* that Martin Bormann was to become, he was Hitler's influential foil and companion—a security blanket.

" 'Hoffmann?' Hitler said. 'You're afraid of Hoffman? He's just a drunk. He's no danger to you.' "

"Hilter wasn't able to separate himself from Hoffmann. He was his *Hofnarr,* his court jester—the only one who could cheer him up when he was feeling low."

Breker became a regular fixture at dinners in the chancellery, and he remains a deep admirer of the man who led his country to disaster. He enjoys recalling Himmler's story of how his Gestapo agents had just arrested and brought back to Germany a painter who had fled to Spain to avoid war. "Give that man his liberty right away," Hitler ordered. "Artists understand nothing about politics. They're like Parsifal."

Breker also credits his contact with Hitler for saving the life of Picasso late in the war, when he was arrested by the Paris Gestapo as a communist. Breker learned of the arrest through an urgent phone call from Jean Cocteau, whom he had known in his Montparnasse days, and took the simplest expedient possible: He went to Gestapo headquarters in Berlin and blustered the general in charge into calling Paris to rescind the arrest order. The general obeyed, because he knew Breker had Hitler's ear.

Of all those who lived through the period in Hitler's wake, it is Albert Speer who has the clearest vision about the artistic achievements of the Reich. After his years of reflection, in Spandau prison and in his home in Heidelberg, he is as devastating on the subject as he is about the ideology behind it all.

"Hitler lacked the ability to approach a problem from different sides and to see it with several perspectives. He was the same way in politics. He became a prisoner of his idées fixes. I would say, finally, that nothing of any artistic value was generated by that period. The Third Reich wasn't anti-art, because the state spent a lot of money on it, but the whole atmosphere was anti-artistic."

Does state-ordered art inevitably mean mediocrity? There are plenty of comparisons to be made—including the often-successful "WPA Art" in America—but the most obvious and inescapable one is the Socialist Realism of Eastern Europe and especially the USSR.

"Exactly the same thing," Peiner declares without hesitation. "All dictatorships everywhere will produce the same kind of art."

Peiner and Breker and all the other apprentice Fausts like to believe that they were above politics, but of course they were not. They had eyes to see and ears to hear, and yet they served the regime happily. "The Third Reich gave big tasks to artists," Peiner told me almost plaintively. "No one else did. There are no great tasks today. Art is decadent. I would have been happy to do tasks for Stalin or Roosevelt or Churchill, but they didn't ask me. No one gives great tasks anymore."

Apocalypse: War was to be another mighty tapestry. This nightmarish detail, complete with gouts of blood and maddened eyes, is from Werner Peiner's cartoon.

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By James K. Page jr and Wilson Clark

The new alchemy: how to survive in your spare time

With wind, sun and the scientific method, a small group on Cape Cod is designing ways people can live more gently on the Earth

In this backyard fish farm, wind pumps water into a solar heat collector (far right). From there it flows

On the way south from Boston you pass two big, conspicuously white natural-gas tanks in the midst of a gray-brown industrial wasteland. One says "Bostongas," the other has been decorated with brightly colored stripes and signed by Sister Corita—a gay and no doubt unintended reminder of how much our attitudes and livelihoods depend on a rapidly diminishing supply of fossil fuels and the economy they power.

Farther south, where the breeze blows variably across the elbow of Cape Cod, a sudden gust flaps the red sails of a homemade windmill and one has entered a different world altogether. The rotor turns, pumping water up a hill and through a solar heat collector and, now some 20 degrees warmer, the water gurgles into a sophisticated, handcrafted fish-culturing experiment—a modest suggestion that people may be able to live independently and well.

The windmill creaks and turns near Falmouth, Massachusetts, on a 12-acre farm rented by The New Alchemy Institute which, despite the sound of its name, is not a band of well-meaning, mystical communards in flight from the realities of science and society. It is, instead, a group of thoroughly rational professionals seeking to apply the insights of science on a smaller, human scale so that—according to one of the institute's founders, a marine biologist named John Todd—we may learn to live more gently upon the Earth.

A Canadian, Todd is an energetic man in his mid-thirties who eschews chairs. Instead, when not in motion, he is found leaning lightly against a table or whatever else is handy, as if always ready to pounce on some new project, some new idea. In the mid-1960s Todd began research into fish navigation and communication at the University of Michigan. There he discovered that some fish have evolved a complicated chemical language, and he also met a young American fish ecologist, William McLarney.

Several years later the two men worked together at the San Diego State University, prying into the influence of environmental stress on fish behavior. They found that minute amounts of poisons, such as DDT, could effectively sever the social bonds that link an animal's behavior, its environment and its vulnerability to stress. In the late 1960s their work led Todd to the Woods Hole Oceanographic Institution on Cape Cod, while McLarney co-authored the now standard text on aquaculture.

Neither of them liked the "doom-watch aspect" of

Wilson Clark's articles on energy and agriculture appeared in the previous two issues of Smithsonian. *Mr. Page is on the magazine's Board of Editors.*

into greenhouse (left) where hundreds of fish grow. This and most other photographs by Fritz Goro.

Canadian marine biologist John Todd: "We're trying to duplicate the restorative processes of nature."

their work and they began to seek positive steps—a path by which the world might find a way out of its interrelated problems of energy, food, environmental degradation and Man's estrangement from himself, his fellow men and nature.

Their solution to such a vast array of difficulties was to suggest that by small-scale farming in their spare time, people could help themselves and the planet. To back up such a seemingly frail idea was their awareness that, as they have since written, "Psychically, people are drawn to living things, even when their pets are just caricatures of nature. There is something basic about the need in most of us for a relationship with nonhuman life—even in our plastic-fantastic society where nature herself is feared . . . people could learn to grow foods, just as they learn to read or write or drive a car. Perhaps they need only to be convinced . . . that food culture is as enlarging in its way as writing or reading, and has the added advantage of being a survival tool."

In 1969 with a few like-minded colleagues in San Diego, Todd, his wife, Nancy Jack Todd, and McLarney formed The New Alchemy Institute, not in the hope of turning lead into gold but harking back to an earlier meaning of the word "alchemy"—an ancient science of nature that says that the sun, the soil and man, working together, can create a whole that is greater than the separate parts.

They looked into wind power, solar power, less energy-intensive and more ecologically sound farming practices and fish culture. In the spring of 1972, the institute leased a farm a few miles north of Woods Hole—one of the few remaining pieces of farmland in the area—and began to test some of their theories.

Among the first efforts was to produce a backyard fish farm from which a small group of people might grow most of their animal protein needs in a small space. Another was to refine, with scientific expertise, the folk wisdom of organic gardening: Below the slope where the red sail-winged windmill stands are neat, if unorthodox, gardens bordered with rows of marigolds and swaying sunflowers.

The windmill, 26 feet high, is what people notice first. The tower, designed by Marcus Sherman, a quiet, bespectacled young new alchemist who also spends winters in India building windmills, is made of

On Saturdays, visitors come to observe and share picnic lunch. Here Nancy Todd (right, center) is flanked by

light materials—two-by-fours for the tower, strung with interior guy wires to achieve strength. The dacron sails and rigging were designed by a well-known local sailmaker, Merrill Hall, whose name is more often associated with racing yachts than with windmills. The sails, on steel tubes, are mounted on a plywood turntable that is fastened in turn to an old automobile crankshaft raided from the local dump. It can pump 500 gallons of water an hour in a good breeze and, excluding labor and a $30 pump, the entire rig cost $450. Says Marcus Sherman: "Anyone who can tinker with an automobile engine could build one of these things."

The mill pumps water up the slope into the solar collector, which consists of several glass panels mounted over black corrugated aluminum. Depending on how fast the water drips down over the aluminum, which depends on how much wind there is, it gains anywhere from 10 to 20 degrees of heat.

There is a certain amount of trial and error in new alchemy. Condensation on the glass panels reduces the amount of solar penetration, so a variety of solutions were tried, such as leaving an open strip between the glass and aluminum at the top, or at the bottom. Only one of the 16 glass panels stays clear of condensation—the one under which someone thought to drill a few small holes for air. Earle Barnhart, formerly a biology student who is now in charge of the institute's solar and wind energy research, explained that "NASA would throw up their hands in despair over this kind of thing. They want to build the perfect solar collector. We don't care about perfection. We just want equipment that will work, that anyone could duplicate with only a basement shop." At The New Alchemy Institute, they do their experiments on an already working system, because each component is needed by the biological system. It's like improving a spaceship while flying through space.

On cloudy days, the water continues to circulate, but is shunted past the solar collectors to reduce heat loss. The water retains heat well enough so that even in extended bad weather the temperature does not get too cold for the fish. When the wind stops, the water stops circulating, and then it is plants that keep the water oxygenated. No electricity is used.

The windmill and the solar collector are part of a closed ecological system—or almost closed. The water needs to be around 80 degrees because it is tropical fish that are being raised: tilapia, otherwise known as St. Peter's fish, common in Africa and the Middle East. Tilapia were chosen because the new alchemists decided that algae, traditionally the enemy of fish culturists, might well be the basis for such a project. (It's like crabgrass: If you could get crabgrass on your side, you'd be way ahead.) Algae are easy to grow in small ponds—it's almost unavoidable—and there are fish that eat algae. But, wrote Todd and McLarney in the institute's *Journal* (edited and published once a year by Nancy Jack Todd as the major benefit of membership —now some 1,000—and the institute's main educational tool): "When the great god Pan came to dispensing fish into the lakes and streams of North America, he neglected, for some capricious reason, to give us vege-

British economist Eugene Schumacher (wearing hat) and Harvard's Nobel Laureate biologist George Wald.

Earle Barnhart sets a piece of wood on fire, using solar furnace he built with hand mirrors and a little math.

tarian fish large enough or sufficiently good-tasting to eat." So they chose tilapia and, because of the long history of Chinese carp culture, two species of carp.

By gravity, the warm water moves from the solar heater into the first of three slightly asymmetrical A-frame greenhouses, into a tank that contains quahog and oyster shells. The bacteria on the shells remove growth-inhibiting fish wastes from the water. An earth filter in an adjacent tank also supports typical aquarium plants that serve to oxygenate the water. From there, the water falls into a second greenhouse where such microorganisms as daphnia, collected in season from local streams and ponds, undergo a population explosion so great that the water is visibly full of little specks. And from there, the water, now a thick green soup of algae and animal protein, falls into the third greenhouse—a tank some 15 feet by 15 feet—in which several hundred tilapia grow to edible size in as little as three months. The *New York Times* food editor not long ago adjudged them a gourmet's delight.

That many fish in such small quarters rather quickly foul the water with wastes, so the water is pumped from the fish tank back up the hill and into the solar collector and then into the quahog filter and so on. At least most of it is. There was a leak last summer

Barnhart and Bryce Butler, a former theologian, peer into fishpond, dark with algae, inside the mini-ark.

through the cement-block wall of the middle greenhouse; rather than fix the leak, Todd decided that he would see if he could grow rice in the tiny bog thus created. It was planted late in the season and was a bit stunted, but Todd feels that he has shown nonetheless that Cape Codders could grow rice if they wanted.

Also, Todd lets some of the waste water run off into a small experimental garden below the fish tank. There McLarney grows a variety of vegetables to see which ones do better with fish waste and which don't. Lettuce, for example, does better, while beets and zucchini grow better in tap water. Another linkage between fish and plant culture is the plants growing inside the mini-ark in the (often) 90-degree, humid climate it creates. Which grow best? Todd will soon know. One plant that overwintered in the mini-ark—one that Bill McLarney brought back from Belize—is an undomesticated tomato. A tropical fruit called naranjilla was still being produced in December: According to McLarney, it tastes like a cross between a strawberry, a melon and an orange.

McLarney has his own fish farming experiment, a somewhat less technologically complicated arrangement in which two species of tilapia plus various other fish thrive in a deep green algae soup in a circular pond housed under a plastic-covered geodesic dome. The plastic, unfortunately, turns opaque in the course of time, occluding the sun, and begins to fall apart; the institute is wondering whether a glass dome would be economically feasible. McLarney's experiment uses an electric motor (1,725 watts) to pump the water through a quahog-shell filter and back into the pond. McLarney's fish are fed from outside sources—weeds such as purslane, garden wastes such as carrot tops, and midge larvae that are cultured elsewhere on the farm.

Last fall, just before harvesting the fish, McLarney stood by his pond, his long lugubrious moustache drooping in the humidity as he checked a thermometer that gave readings of room temperature, outdoor temperature and water temperature, and said, "We aren't growing a commercial quantity of fish by any means, but it's fine for feeding a small gang of people."

Over the winter, a friend with engineering and computer experience used the precise measurements of temperatures in and out of the geodesic dome to predict its performance in other climates. "Then," says

Tyrone Cashman (right), formerly a Jesuit priest, gets some assistance with experimental compost heap.

Earle Barnhart, "we can tell some guy in Maine, for example, just what to expect from a pond like this."

McLarney's primitive tomato plant that grows in the mini-ark is no accident. He is the primary operative in the institute's Costa Rican installation, a recently purchased small farm in the remotest part of the country's Caribbean coast. (There is also a New Alchemy Institute operation in California.)

Tropical agriculture and land use being one of the most complex of ecosystems, as well as one of the most seriously abused, Todd and McLarney saw in Costa Rica a considerable challenge. Two winters ago, McLarney had dug a large pond on the Costa Rican installation—a reservoir. The trouble was that Lake McLarney, as it came to be known, didn't hold water. Borrowing a concept from an obscure Russian source they had come across, an associate of McLarney lined a large pond with layers of vegetation and then covered that with earth. The result is what is sometimes called *gley* soil, which means that it is not porous. And what that means is that there is now a reservoir capable of holding water for months at a time—water that comes only from seasonal rains. "Think of it," says Todd. "There are so many people living in parts of the world where reservoirs have been too expensive to build. What could be simpler?"

Simplicity is the rule at The New Alchemy Institute. For example, at an early stage in their lives, the tilapia's main food requirement is animal protein, not algae, and a common source in fish culturing is bloodworms, the tiny red larvae of midges. Burlap bags hung in trenches filled with water that has been fertilized with Milorganite, sterilized human waste from Milwaukee, will be covered with larvae in a matter of days. Bloodworms are often raised in this manner—for example, in Israeli aquaculture—and usually some mechanized or labor-intensive means is used to harvest the larvae for the fish. At NAI they merely toss the worm-covered burlap bags into McLarney's pond and let the tilapia do the harvesting. A simple idea, but no one had thought of it before.

Marcus Sherman, windmill expert, removes burlap covered with midge larvae grown as food for the fish.

Sharing the cabbage

In another project, the young woman in charge of agricultural research at the institute, Hilde Atema Maingay, has spent the last two summers experimenting with the cabbage patch, asking a question that had apparently not been asked properly before: What kind of cabbage is most insect-resistant? (Pesticides are anathema to the institute for the usual organic gardener's reasons, but also because of their potential harm to the fish.)

Research in Wisconsin had indicated that a particular variety of cabbage called Red Acre was most

Hilde Atema Maingay keeps painstaking records in attempt to identify most insect-resistant cabbage.

resistant to the depredations of the cabbage-worm butterfly. Ms. Maingay planted some 20 varieties in a random pattern and kept meticulous records of the number of cabbage worms on each head. Red Acre indeed had the fewest worms, but was by no means the ideal strain because it also proved to be among the least productive in terms of marketable heads of cabbage. She found that other varities such as Round Up, Red Rock and Savoy King harbored more insects but produced more and bigger heads. "In our gardens," Ms. Maingay has written, "we should be growing those varieties that the cabbage butterflies survive upon, without destroying . . . so that we will be assured that the little white butterfly, with dots on the wings, will remain with us."

"We're trying to duplicate the restorative processes of nature," Todd has said. "So we link everything with something else. Each time we make a connection, the whole becomes stronger and more stable." The core of the effort is an ecologically derived approach to the intensive culture of foods—systems that are independent of food and fuel shortages, systems that can be adopted to many climates throughout the world, even into urban areas.

Not every experiment leads to so kindly a conclusion as Hilde Maingay's cabbages and butterflies. Standing in a small patch of land in which various kinds of compost were being analyzed, Todd said: "This is one of The New Alchemy Institute's poor ideas." In an earlier season they had penned up a number of rabbits on the site. "But they didn't fit into any of our ecological systems; they just weren't self-sustaining." So what happened to them? "We ate 'em," said Todd a bit ruefully. At that point a thin, bearded man, Tyrone Cashman, approached. A former Jesuit theologian and philosopher, he is involved chiefly with composting experiments.

"What's this white stuff in the compost?" he asked.

"I dunno. Lime, I guess," said Todd.

"Who put it here? Gee, there goes that experiment," said Ty, smiling but disappointed.

"Things sometimes get confused around here," said Todd. "Everyone is enthusiastic and wants to help. I went into the mini-ark the other day and someone had left it in a mess. I was furious, but then I realized that whoever it was had also put in all the insulation for me. How can you complain about that?"

Although Todd and McLarney are clearly the guiding lights of The New Alchemy Institute-East, the 12 people who work at the farm somehow manage to cooperate in a loose, egalitarian system. None of them lives at the farm—the old farmhouse is used as office space. "Not having land at first is the best thing that happened to us," said Todd. "With this rented farm, the members had to live out in the community."

"We get together at each other's houses in the evening," said Ty Cashman. "But as John says, we're all such good friends we know we couldn't live together."

This spring the institute plans to build a larger food-growing complex—the Ark—to analyze more closely energy budgets and the microeconomics of backyard fish farming and to investigate the limits of scale versus volume. They intend also to build a seven-kilowatt wind power system—enough to power a house in average winds of six to seven miles per hour. And they are developing plans for a family-sized food, energy and housing complex for Prince Edward Island in Canada.

Asked how his former scientific colleagues felt about what he is attempting, Todd replied: "Scientists simply say we aren't doing science. That's how they handle it. A problem scientists have with us is that anyone who comes here can look around and say to himself 'I could do that.' There's none of the usual mystery about our kind of science. We publish our results for people, not just for colleagues. Another problem is that we bring in excellent people who aren't scientists—theologians, musicians, a poet.

"We aren't antiscience or antitechnology. I think it's essential to *save* science and technology—but it can and must be done on a human scale. We believe that the quality of the whole depends on the quality of the smallest parts, so we concern ourselves with what we hope are micro-solutions. We are looking back again to the Renaissance alchemist, Giordano Bruno, who saw science as a sacred discourse with nature. I like that attitude—I don't believe it is the kind that produces hydrogen bombs."

In the tropical conditions under this plastic-covered geodesic dome, four species of fish are growing.

Shadows-on-the-Teche

Lyndhurst

The National Trust Collection

By James Biddle

George Washington was two years old when John Drayton, a member of the King's Council for the Colony of South Carolina, broke ground for a two-storey brick mansion on the Ashley River, 12 miles upstream from Charleston. It stood sturdily through the Revolutionary War and the War of 1812, and is one of the few great Carolina houses to escape the ravages of the Civil War.

And although Drayton Hall is celebrated as one of the great architectural and historical treasures of America, its survival is threatened. Deterioration and vandalism have taken a heavy toll and up to $2,000,000 is urgently needed for preservation and the creation of an endowment which will insure the proper long-range support of this priceless landmark.

If we succeed in raising half this sum, aided by sales of the National Trust Collection of Fine Porcelain Boxes, we can obtain an equal amount of federal funds. Every dollar you give is worth two in our fight to save Drayton Hall. Clearly, your support is of critical importance.

If you join us in this cause, you will be invited to attend a dedication of Drayton Hall next April. A Southern country breakfast will be provided at the Plantation, followed by a reception at Russell House, headquarters of the Historic Charleston Foundation and one of the most beautiful early 19th century houses in America. There we will celebrate the rescue of Drayton Hall and mark the completion of our twenty-fifth year as the only non-governmental organization chartered by Congress to safeguard America's cultural and historical heritage.

The invitation list will include our five Honorary Members, Mrs. Nixon, Mrs. Johnson, Mrs. Onassis, Mrs. Eisenhower and Mrs. Truman. The Secretary of the Interior and members of Congress will be invited, as will eminent architects, historians and preservationists.

A specially commissioned medallion will be struck to honor this significant milestone in the history of preservation, and each subscriber will receive a serially numbered copy in pure silver, or in bronze.

Actual size

Drayton Hall Serially numbered medallion celebrating the rescue of Drayton Hall and the Twenty-Fifth Anniversary of the National Trust. Combined silver and bronze edition limited to 2500.

The National Trust Collection of Fine Porcelain Boxes celebrates some of the historic properties which the Trust preserves for public benefit: Cliveden, Woodlawn, Shadows-on-the-Teche, Lyndhurst, and Decatur House. We selected for this demanding project the finest of the few craftsmen in the world capable of meeting our standards: the famous and venerable Porcelaine de Paris.

Each box is different in shape, made from models over 100 years old and is decorated in exquisite detail from original oils, watercolors, and design motifs found within our National Trust properties. The artists who inspired these designs include Edward Savage (1789), John Robert Murray (1824), Alexander Jackson Davis (1838), and Currier & Ives (1875).

Of course, fine art cannot be transferred directly to porcelain but must be repainted for the medium by highly skilled artists. Two were selected for this delicate assignment, each with 25 years of experience. Both have been named "Best Worker of France", an extraordinary award given but once every three years to a handful of workers in the entire nation.

The secret of making porcelain was guarded by its Chinese originators for 1200 years. It was not until 1709 that an alchemist in Meissen discovered the Chinese formula, but he kept it only a decade. During this short span, German artisans developed porcelain as an art form, and when other European centers learned the secret, they contributed to the state of the art.

Paris was one of these centers, and outstanding among its many factories was Porcelaine de Paris, established by Jean Baptiste Locre in 1773 — the year of our Boston Tea Party. It has been, since 1860, the sole surviving porcelain factory in the City of Paris.

The Prospect of Appreciation

There is no guarantee that these boxes will increase in value. However, it has become abundantly clear in recent years that the greatest increase among collectors' items is

James Biddle, President of the National Trust for Historic Preservation, was Curator of the American Wing of the Metropolitan Museum of Art.

Decatur House

Woodlawn

Cliveden

of Fine Porcelain Boxes

obtained by limited editions with specific characteristics:

- The issue must be officially sanctioned.
- The quality of materials used should be, simply, the best obtainable.
- The artistic merit must be exceptional.
- The craftsmanship must be impeccable.
- The edition must be strictly limited.

It is my opinion that these boxes meet our exacting requirements in every respect. Whether you wish to purchase them for aesthetic, charitable, or investment reasons — or all three — we commend them to your consideration.

For your information, antique porcelain boxes, especially those from the 18th century, are bringing extremely high prices. In the past five years, prices have more than tripled. At one recent Sotheby Parke-Bernet auction, a 1745 gold-mounted porcelain box from Meissen fetched $2,400, and at another auction, 11 boxes were knocked down at prices ranging from $175 to $30,000 each.

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The National Trust Collection is strictly limited to 2,500 sets. Each one of the five boxes in every set is serially numbered. Orders will be filled in the exact sequence in which they are received, one set per subscriber.

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Send us your check for $600 to purchase your set of The National Trust Collection of Fine Porcelain Boxes. Your payment will be acknowledged and you will be informed of your number in the limited edition. (Should we offer another group of boxes at some future date, the first opportunity to purchase a set bearing your serial number will be reserved for you.) In consideration of your full payment in advance, you will receive a .999 fine silver medallion struck to commemorate our twenty-five years of dedication to historic preservation and the rescue of Drayton Hall.

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SM

The skulls of garden moles: The teeth, some for biting and some for crushing, suggest a wide, varied diet.

In the swollen sides of the skulls and the shape of the jaws are other echoes of the owners' life-style.

Text and photographs
by Victor B. Scheffer

Reflections on the skull

When an animal dies it leaves behind not just bones but a precisely engineered record that the observer can translate

So near they are and yet so far apart . . . the living and the dead.

The skull is a link between time past, filled with color and motion, and time forever still. Its bony vault echoes for a little while the sounds that once vibrated from living tissue.

Every skull in shape and structure, in smallest part, tooth, line, pore and cavity, memorializes a way of life that once identified a species and a creature, named or nameless. Every skull contains cryptic data which—translated as the words of a dead language—illuminate a bygone pattern of behavior. This fact is unknown to those who gently ridicule the zoologist in the Smithsonian's National Museum of Natural History for his interest in dry bones.

Of all the vital needs of any animal, that for food is paramount, and because each kind of animal has chosen (so to speak) a special diet, its teeth and bony mouthparts have been molded by evolution to adapt it to that food. With its mouth at the front where the action is, the organism propels itself through geologic time. Any mutation or alteration by genetic chance will persist in the skull if it proves to have survival value to the animal, but such changes will disappear in time if they do not.

So distinct are the differences among tooth patterns of animals that they show the zoologist how the family tree of vertebrate life may have grown and branched during the past 400 million years. Though some of us may question the fossil expert who spins an imaginary tale around a handful of teeth, reconstructing the lifestyle of their unknown, long-departed owner, the expert knows that the sculpturing of ivory and enamel, root and crown was done precisely to fit one animal to one environmental niche.

The teeth of no two animals are alike, yet the teeth of all insect-eaters share features in common, as do those of seed-crushers, nectar-sippers, bloodsuckers, flesh-rippers and grazers.

The garden mole—its skull is shown on the opposite page—is equipped to tear and chew earthworms and wireworms, grubs, beetles, centipedes, slugs and other crawling life, as well as plant roots and bulbs, which it finds in its tunnel. Of course, the diet of the mole is known from the study of actual food remains in stomachs, but even without that kind of evidence, a zoologist could tell by looking at the teeth, some of which are adapted for biting and others for crushing, that the mole must have preyed on a wide variety of subterranean organisms.

Even the sexual behavior of an animal is reflected to a degree in the build of its skull. The cranium of the male Alaskan fur seal, for example, is much larger and the saber teeth are far stronger than those of the female, and only the cranium of the male has a bony ridge to anchor the powerful jaw muscles. These differences point to the polygamous nature of the beast. The male fights fiercely with other males for territory and is, on the average, some four to five times larger than the female.

Rising from the skulls of the hoofed animals—deer, giraffes, cattle, buffalo, antelope, goats, sheep and others—are horns or antlers which are used for sexual display or downright combat. The antlers of the caribou—relative of the reindeer—are present in both sexes and are used for gathering food as well as for display. The brow tines have become flattened into snow shovels and they are employed to expose tundra vegetation in winter.

If handed the skull of an unknown beast, the zoologist can estimate the sensory powers of the animal in life—its ability to see, smell and hear. The chambers of the cranium are enlarged in proportion as the visual, auditory and other nervous tissues of the brain are important to the animal.

Quite surely the swollen sides of the mole skull are related to acute hearing, though I am not aware of studies which support this guess. All skulls are perforated and channeled for the passage of blood vessels and nerves, the larger the passage, the more

Dr. Scheffer, winner of a National Book Award and author of several SMITHSONIAN *articles, is now chairman of the Marine Mammal Commission.*

valuable the function of the sensory organ to which it leads. Like a nautical chart, the surface of a skull is a tracework of meaning.

And finally the artist, without benefit of zoology, knows intuitively the meaning of the skull. He sees the preciseness of fit, the economy of line, the essential rightness, the architecture remaining beyond an infinite number of rejected plans.

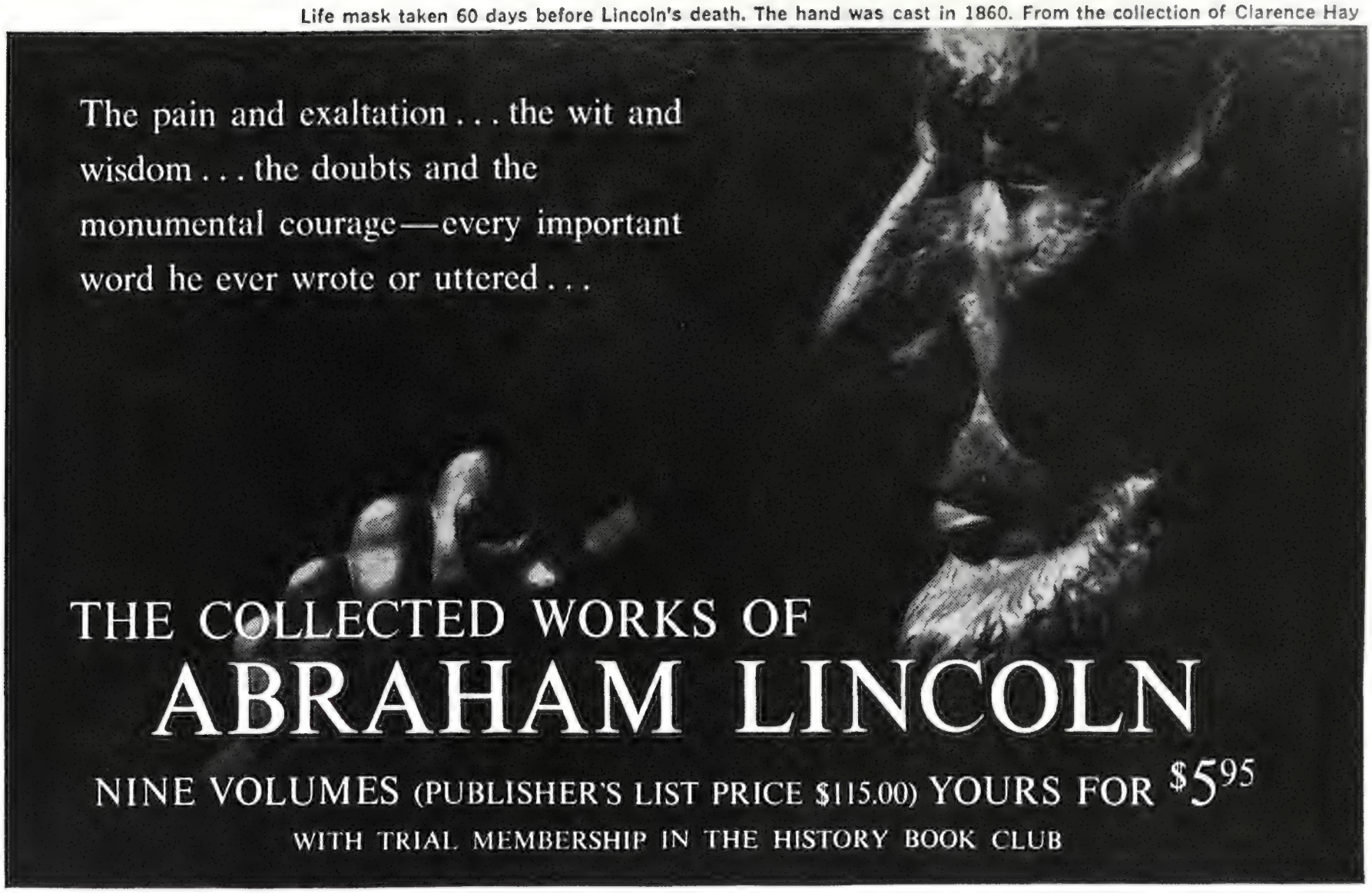
A sketch for a Mesozoic reptile shows dimly in the scheme of the mole, as though an artist of infinite patience had continually weighed the old values against the new.

Now the human artist holds the white capsule in his hand and marvels at its machinery. He turns to it again and again to touch the skull and feel its timeless beauty.

With this fist-sized earbone, the humpback whale no doubt heard fellows' songs differently from the record.

Flattened upper molars of the sea otter (above) bespeak the crushing of shellfish. No abstraction, the precisely sculpted form below is a tooth of a crabeater seal, designed for raking up plankton.

Life mask taken 60 days before Lincoln's death. The hand was cast in 1860. From the collection of Clarence Hay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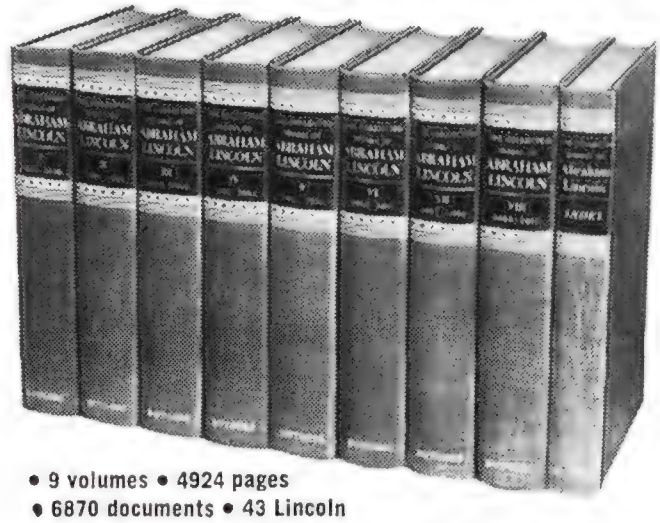

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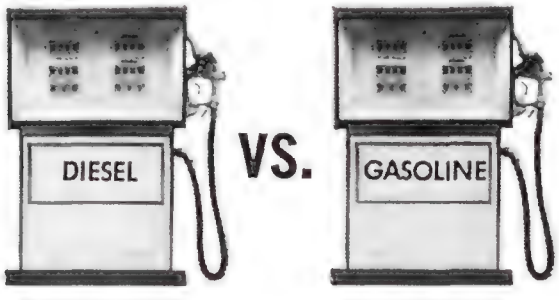

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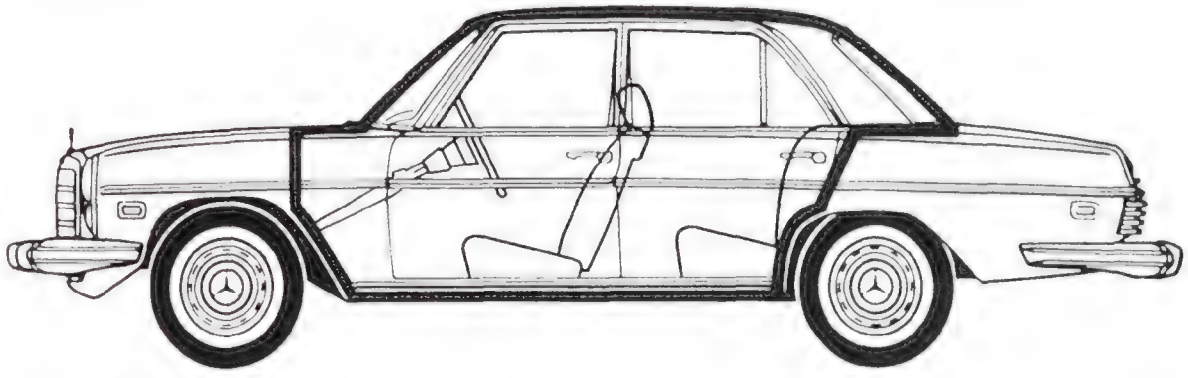

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D.M. Ferry's posters, above and opposite, turned up in the hardware store before planting time.

By Ken and Pat Kraft

Ah, the old-time seed catalogs!

What greater delight than to study them on a winter's evening—for if gardening was on the mind, could spring be far behind?

Here and there and now and then, someone poking through a dusty attic comes across one of the old-time seed catalogs. To most, the discovery is a bittersweet delight. For ah, those old seed catalogs—chock-full of enchantment and promise, described the joys of plants just as does the enticing catalog of this season. Seventy-five or a hundred years ago the family garden was part drugstore, part household supplier, part entertainment center and more, aside from its chief role of food producer.

"Novelties" was the name of the game back then. New plants came sometimes from the ends of the Earth, sometimes from just around the corner. New York state seedsman Joseph Harris found a neighbor growing an unusually fine lettuce. She was an industrious German woman who some years before had been left a widow with several young children. "The relatives of the husband tried to get the small farm away from her," but a friend foiled them, and in gratitude the lettuce was named The Deacon in his honor. It became a popular butterhead variety of its day—1879 and later.

A squash introduced in 1884 had been a family secret for years until a persuasive seedsman got some seeds. He promptly named the squash White Pineapple. It looked something like a pineapple—maybe—but its dazzling merit was its taste, "being of a rich and most decided coconut flavor—so much so that pies made of this squash have been mistaken for coconut pies." Furthermore, it proved a good winter keeper. One wonders why in the world such a paragon of a squash vanished from sight, for we know of nothing like it today. You can eat any winter squash during its growing season, as if it were a summer squash, but it probably won't taste like coconut.

If you wanted to taste your very own licorice, though, the Germain Fruit Company of Los Angeles would have sold you the seeds. They were listed in the 1896 catalog at 30 cents an ounce; the plant is *Glycyrrhiza glabra* and licorice is extract of the roots.

Gardeners of the 1880s who wanted to grow an approximation of coffee could buy seeds of the large-rooted chicory, "the dried roots of which," said one catalog, "are much used in Europe as a substitute for coffee." They were—and are—also used in the South. Seeds of the large-rooted chicory are a little hard to find today, but witloof chicory does almost as well and most seedsmen handle it. You can still thinly slice and oven-dry the peeled roots, grind them, and mix with about five parts of ground coffee. The resulting brew will bear a reasonable resemblance to New Orleans coffee with its chicory taste.

Ken and Pat Kraft, married co-authors, live in the Northwest and have written books on gardening.

Once a gardener could grow himself a broom by planting broom corn. A grass, its seed cost 40 cents a pound a few generations back. And jute seed was offered by Germain's in 1896, to grow your own fiber wherewith to make gunnysacks and ropes.

Gourds are offered by today's seedsmen, but for fall decorations. Old-time seedsmen had no truck with such frivolity. "The following varieties will be found useful for household and farm purposes," said one, and proceeded to describe in functional terms the egg gourd (for nest eggs, to encourage hens to lay); the dishcloth gourd or luffa (its fibrous interior, dried, made the dishcloth); the sugar-trough gourd ("Useful as buckets, baskets, nest boxes, soap and salt dishes, and for storing the winter's lard"); and the dipper gourd ("convenient for dipping hot liquids, as the handles do not heat through readily"). You can still buy these gourds, though usually only in assortments of small and large gourds. And bath sponges from the dishcloth gourd can be found in some drugstores today, at about $1.75 each.

Jerusalem artichokes fed to hogs

Seeds of the globe artichoke are now hard to find (the plant is touchy about climate, and its seeds never come quite true to variety), but you could buy a packet for five to ten cents years ago and try your luck. Peter Henderson Seed Company of New York City also listed Jerusalem artichokes, a plant which actually belongs to the sunflower family, and grows edible tubers that farmers used to feed to hogs. The plant was not widely known here, nor is it yet, but a few seedsmen handle it. The tubers taste like water chestnuts —much too good for hogs.

Tomatoes were not as popular with gardeners of a century ago as they are today, but they were far from being a mere curiosity. The catalog of the then Detroit-based D. M. Ferry Company observed in 1881: "Since its introduction to the use of the table, and the discovery of its exceedingly wholesome properties, the Tomato has been rapidly gaining in favor." The only varieties of that day that have lasted, however, are the small-fruited ones. These, closer to the ancestors of all tomatoes, were readily available in the 1880s in the small plum, pear, and cherry shapes, the latter two in both red and yellow types. In 1892 Henderson's introduced the huge Ponderosa tomato that sometimes weighed four pounds and is still on the market; beefsteak tomato is a look-alike. By the end of the 19th century, a catalog could state: "The tomato now rivals all other vegetables and fruits in popularity, having reached a use beyond that of the potato and apple combined."

Swiss chard was but little known to gardeners of the 1880s, who were advised that it was also called silver beet—as it is today in Australia—and that the stalks made attractive pickles. The plant "also furnishes admirable and healthy food for chickens," one seedsman remarked.

Giant watermelons were often a favorite subject for catalog artists. One farmer raised a 111-pounder.

One of the most striking differences between those old seed catalogs and today's is in some variety names that no modern merchandiser would dream of using. There was a cantaloupe called Log of Wood, for its shape, and a watermelon called Scaly Bark. A sweet pepper was dubbed Monstrous and a big potato, White Elephant. A variety of spinach (also spelled "spinage" in some old catalogs) was called Prickly, and a very nice butterhead lettuce had the discouraging name of Blonde Blockhead. "Electric" seemed to seedsmen a splendid name for a new beet, since electricity ranked as a novelty.

Have you ever wondered what Giant Fringed Oyster endive, still a good variety, has to do with oysters? Simple. In Philadelphia and other Eastern cities, as

the old Philadelphia seedsman W. Atlee Burpee told his customers, it was used to decorate displays of oysters during winter in the better restaurants and oyster houses.

Old-time seedsmen sometimes seemed blunt in their descriptions. Florence (sweet) fennel even today is not a widely grown vegetable, but until 1884 it was not known at all in America. Burpee's introduced it in this way: "It has a rather peculiar but delightful flavor." The standard descriptive term today is "anise-like." Mr. Burpee also found a cantaloupe named Orange Christiana peculiar in flavor, but "by some highly esteemed."

Of a beet, Egyptian Blood Turnip, Mr. Harris said it was delicious when young but nothing much later on. And anyway, he added darkly, "I find it very difficult to raise the seed of this variety." He also had trouble with celeriac. "I either do not know how to raise this," he exclaimed in 1880, "or it is not worthy of much attention; it is useful, perhaps, for flavoring soup, etc." If you feel the same way about celeriac, try simmering it, peeled and thickly sliced, until tender, then serving it either hot or cold, sauced with French dressing.

Corporate caution, probably, has gradually made seedsmen wary of promising how much you can expect to harvest from a planting. Earlier seedsmen had few such qualms. An asparagus popular in the late 19th century, Barr's Mammoth, had spears so huge the gardener was advised they could run two to the pound. A so-called tree bean that grew into a bush the size of a tomato plant was said by Burpee's to have yielded in one case more than 2,000 beans from a single plant, and the average was figured at about 1,000. A winter squash, Mammoth Whale, often grew fruits of more than 100 pounds each, it was said.

Sometimes seedsmen let customers do the bragging for them. A Minnesota gardener reported digging 173 pounds of potatoes grown from the single pound planted—one eye to a hill and with no special care. That's what he said.

Pumpkins are, of course, pumpkins, and when they are big they are very, very big. Even so, a French product called Mammoth Tours, popular a century ago, made other pumpkins look as if they weren't trying. In its native land, reported a seedsman, one specimen weighed in at 320 pounds. Fearing his readers might find this more than they could swallow, the seedsman included a testimonial from a U.S. customer who said he had raised 37 enormous Mammoth Tours, and that the champion of the lot ran to *350* pounds. If you wonder what in the world a body would do with such a giant, be advised that one use of pumpkins besides for pie was as winter cattle feed.

A Georgia farmer who had taken prizes in the late 1890s for three huge watermelons, the biggest one 111 pounds, told his secret, in a manner of speaking, when interviewed by the *Atlanta Constitution*. "I made three crops in the one season," he said, "by cutting

The Ferry company is now Ferry-Morse and is still going strong, but without catalog sales.

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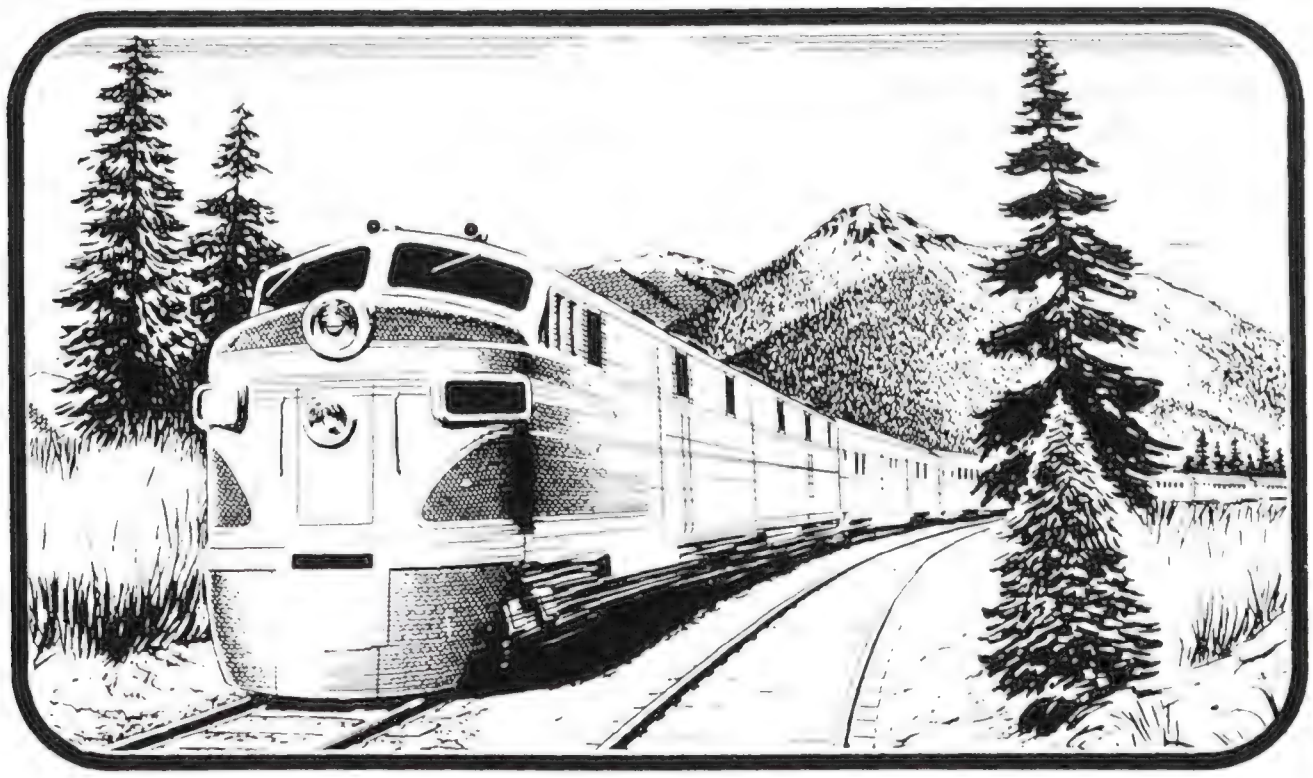

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the vines and the roots so as to make them react." Pruning part of a plant's roots, by driving a spade in the earth around it, may hurry it into maturing a crop, and pruning some stem growth may encourage fruiting in place of leaf growth.

Flowers were offered in the late 19th century, but took a back seat to vegetables in many catalogs, although sweet peas and roses were highly popular, and there were plenty of such old favorites as cosmos, chrysanthemums, pansies, dahlias, geraniums, iris, hollyhocks, petunias, clematis, begonias, stock and, of course, cannas. One seedsman, listing the sensitive plant (*Mimosa pudica*) among flowers, recommended it as fun for the children since the leaves curled when touched, and "the whole plant, especially in hot weather, if struck hard enough, will fall down flat on the ground. It soon recovers and the experiment can be repeated."

Curiously, a health quality was once attributed to the sunflower. Ferry's 1881 catalog stated, "It is raised as an absorbent of miasma in damp or ill-drained situations, thus preventing fevers." The catalog added hopefully, "The flowers are really quite attractive."

Following the Spanish-American War, Henderson's devoted the cover of its 1900 catalog to a hybrid tea rose named for Admiral Dewey. It was a lovely white, blushed with pink, and a top-grade plant cost 75 cents.

Five cents was the usual price for a packet of seeds back when Chester Arthur was President. But, just as today, the way to a bargain was by taking an assortment made up by the seedsmen. Thus, for a mere 2½ cents, a flower gardener of the 1880s could have the following in his packet: aster, balsam, mignonette, pansy, petunia, phlox, sweet pea, verbena, zinnia and a dwarf sunflower recommended for corsages. If he cared to risk a dollar, a vegetable gardener could feed the neighborhood with the 30 packets he'd get of the following: watermelon, cantaloupe, beet, four kinds of onion, two kinds of lettuce, sweet pepper, parsnip, squash, two kinds of radishes, two kinds of tomatoes, turnip, carrot, bush bean, sweet corn, pole beans, cucumber, celery, four kinds of cabbages, cauliflower, salsify and spinach. Plants also came in collections.

Ten tea roses for a dollar

Thus for a dollar (no tax, no extra for handling), you could have ten tea roses or 12 choice chrysanthemums. And if you think air pollution is a modern problem, consider this seed catalog comment of the 1880s: "Remember, the chrysanthemum is a city flower par excellence. Neither smoke nor dust affects it."

Some 19th-century seedsmen supplemented their catalogs with little magazines on gardening, and in Park's Floral Magazine for May 1887, issued by George W. Park Seed Company, now in South Carolina, we find a gardener offering to exchange "silk and worsted scraps and Confederate notes" for "nice bulbs," and a Texan willing to swap "Texan Beetles," for heaven's sake, "for anything in the line of Natural History." In the issue for December 1877, garden etiquette was discussed. "If the walks are narrow, a little care will avoid sweeping one's skirts over the beds, to the injury of the flowers and the nerves of the owner as well," warns the catalog. "Do not pick unbidden a blossom, or even a leaf."

Advice also peppered the catalogs. Frowning on those who tested how well a plant was transplanted by yanking it to see if it would come up, Mr. Harris pointed out in 1880 that it might hold firm but still have air pockets around the roots. "This," he said, "is like leaving your feet bare and trying to keep them warm by putting on a pair of garters." To cheer up gardeners who hated to thin, one old seedsman had this advice as to growing carrots: "It is not necessary

Burpee's is still in business, but it no longer advertises with chubby cupids as in 1901.

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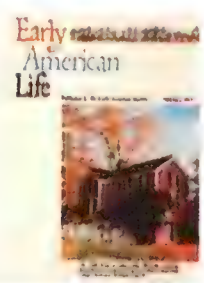

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Vaughan's caught the housewife's fancy with this display of neatly labeled pansies.

to take much pains in thinning them out. They can be left in bunches of four or five together." If the soil is rich and the weeds are kept out, he said, the gardener will have a great yield. His advice still holds good today.

Gardeners of 75 years ago were as impatient as today's lot. One, fidgety at having to wait for his seed order, planted some tomato and radish seed he had stashed away six or seven years before. He was so astounded at results—"practically all came up"—that he complimented his seedsman on this vitality. He didn't say how he had stored the seeds, but the advice might be to keep them cool and dry, perhaps in a sealed bag in the refrigerator. A tomato seed's average life expectancy, by the way, is six or seven years, and that of a radish, like most vegetable seeds, three or four years.

Gardening without poisonous sprays has lately been resurrected, but listen to Mr. Burpee telling gardeners of 1901 how to raise cantaloupes: "As soon as the plants appear above the surface watch carefully for the small bugs or flies which usually prey on them. These can be held in check by dusting the young plants in the morning with soot or land plaster [gypsum]. . . . If several radish seeds are planted in each hill when planting the Musk Melon seed, they will germinate more quickly than the melons and the small flies will eat the leaves in preference to those of the melon plants."

A century ago a seedsman named James Craib was telling gardeners to sow melon seeds thickly, up to three to the inch of row, so there would be enough plants for the bugs. "As the plants grow, thin out the weak ones and all that have been attacked by the bugs," he instructed, gradually ending up with a plant every 1½ to 2 feet.

Hardwood ashes served as an insecticide, and in 1900 Peter Henderson sold them for a dollar per hundred pounds, saying they drove away insects and were a valuable source of potash. They still are, and can be used in place of lime to reduce soil acidity. Those from your fireplace will do.

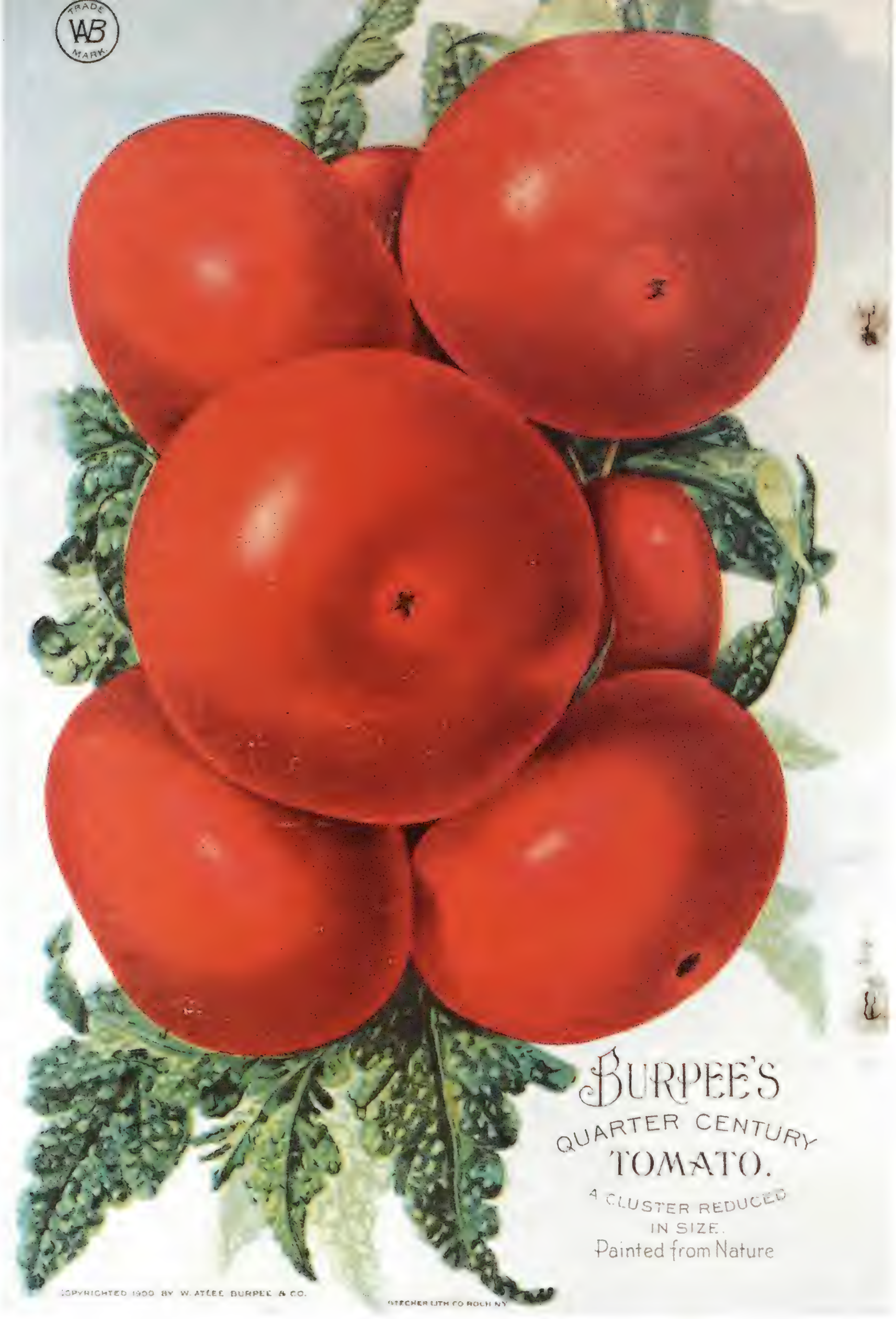
Here was one gardener's fiery tactic against the constant enemy, as reported to Park's in 1877: "For green fly on rose bushes take a shovel of live coals of fire, split open a red pepper and lay on the coals, and hold so that the smoke will go through the bush, and they or any other insect will get off in a hurry."

Chemical fertilizers were not unknown to the 19th-century gardener, but it was largely a day of mix-your-own if you used chemicals in addition to the dependable and familiar manures. To guide these chemical experimenters, one of the seedsmen suggested this combination for general vegetable garden use, to be broadcast at the rate of a handful per square yard when making a seed bed: 50 pounds of nitrate of soda, 100 pounds of superphosphate and 20 pounds of muriate of potash. This is close to a 5-10-5 fertilizer of today. When the plants were growing well they were given a side dressing of nitrate of soda at a rate of a handful to 15 or 20 feet of row.

Well, gardening, like history, repeats itself, and the following, from the 1894 catalog of Vaughan's Seed Store (New York City and Chicago), written in the hard-times year of 1893, may sound up-to-date to 1975's home gardeners. The text speaks of "closer economies which must be put in practice" and suggests that saving can be achieved in no simpler "or more satisfactory way than through the home garden."

Gardeners are asked: "Is not the most certain, direct and unquestionably honest way to create wealth to produce it directly from the soil?—'Put your money in the ground' in the form of seeds and watch the wonderful chemistry of nature transform them, aided by air and sunshine, into products which sustain life and make it also worth living."

These 1900-style tomatoes look too good to be true; a Burpee catalog listed this variety under "novelties."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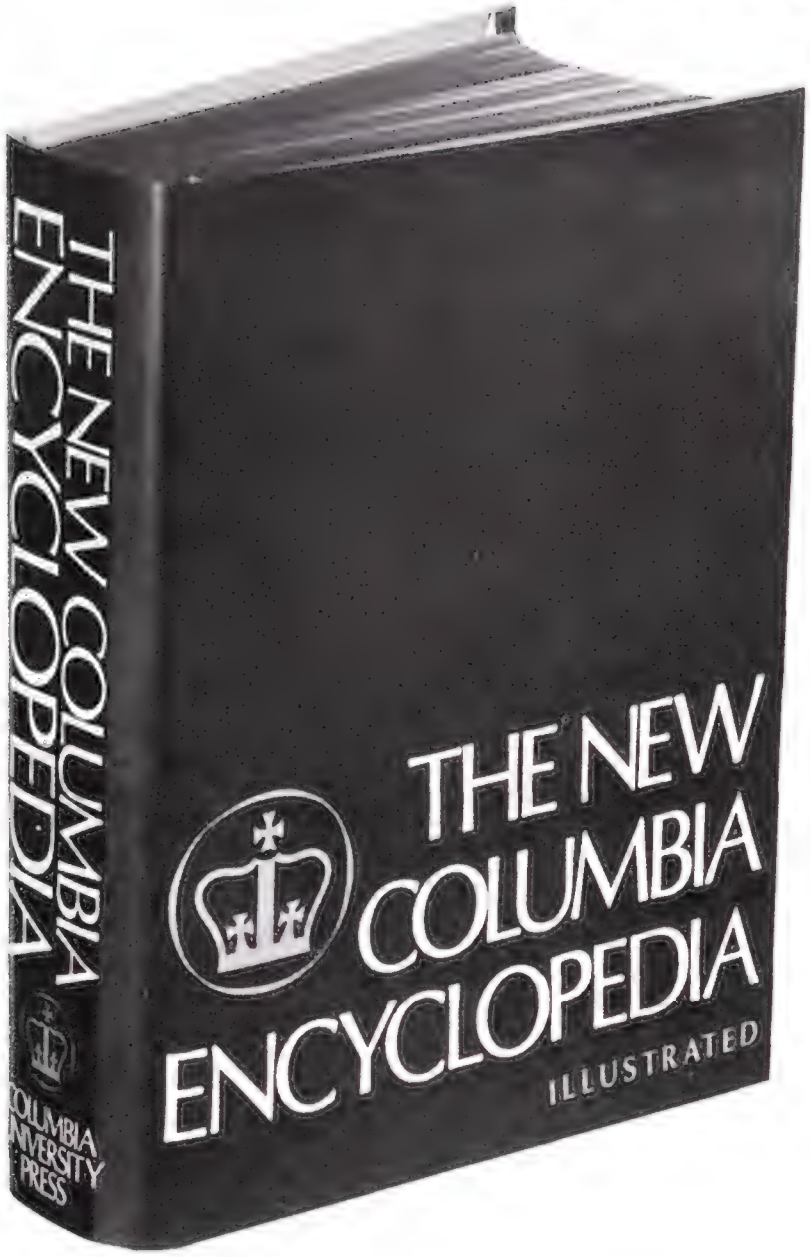

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Dracula dolls await the tourist trade—
part of the package on visit to Draculaland.

By Lucien Agniel

Real Dracula was no tourist attraction

Vampire? Maybe not. But Count Dracula—Vlad the Impaler—was a blood-lusting sadist whose ghost lures Americans to Romania

Bela Lugosi was the most unforgettable of all the film Draculas who chilled audiences.

America's passionate and long-standing love affair with Dracula is a phenomenon worthy of psychiatric study. Ever since the Irish-born novelist Bram Stoker wrote it in 1897, the story of the vampire count of Transylvania has fascinated readers. In those days, when America's innocence was unchallenged, Stoker's Dracula was the wickedest form of escapism. Who can forget the little shiver of apprehension when the gaunt, aging count appears with his greeting: "Welcome to my house! Enter freely and of your own will!"

"The instant I had stepped over the threshold," related Stoker's hero, Jonathan Harker, "he moved impulsively forward, and holding out his hand grasped mine with a strength which made me wince, an effect . . . not lessened by the fact that it seemed as cold as ice—more the hand of a dead than a living man."

The fascination has been fueled by seemingly endless Dracula, or vampire-oriented, films, most prominent of which was the first vampire talkie, in 1931, starring Bela Lugosi as the bloody count. It fused Lugosi's career with Dracula—remember him, canine teeth bared, approaching the nubile, helpless maiden?—and added a new dimension to the legend.

Today, cynical laughter greets late-show replays of Dracula films and vast changes have occurred in the Dracula legend itself—and the uses to which it has been put by its Communist proprietors in Romania.

Diligent scholarship has unearthed in recent years some long dormant facts about the original Dracula, a 15th-century prince whose sadism and murders rank him among the most cruel tyrants of history. In 1972, Raymond T. McNally and Radu Florescu published *In Search of Dracula,* which *Publishers Weekly* called "doubtless the best of the spate of Dracula books that have been a minor publishing phenomenon in the past year." It differentiates between the real Dracula of the 15th century and the 19th-century creation of Bram Stoker's imagination. Also, it explores the twisting trail of circumstances which took Stoker into a never-never land between fact and fiction.

As the scholars sifted and sorted the vampire legends, Romania's president and national party head, Nicolae Ceausescu, was making a few adjustments of his own. Stoker's Dracula trembled at the sign of the cross, shrank from garlic and most feared a sharp stake aimed at his heart. The bright and resourceful Ceausescu faces equally fearsome hazards, for he strives to maintain friendly alliances with both the Soviet Union and the People's Republic of China. Dracula had only to avoid the daylight—and certain specific well-defined dangers. Ceausescu, the helmsman for Romania's independent course, encourages Romanian nationalism and, at the same time, opens his country enthusiastically to tourists from Western Europe and the United States.

Photographs by Lee Battaglia

Hunedoara Castle is where Dracula may have spent part of his youth. It is one of several mysterious fastnesses whose towers rise amid the mountains of Transylvania and Moldavia.

Since he succeeded Gheorghe Gheorghiu-Dej upon the latter's death in 1965, Ceausescu has steadily solidified his power base. And it is Ceausescu's appreciation of the potency of nationalism that has rekindled Romanian interest in the history surrounding the real Dracula—and has promoted the development of a tourist program which promises to bring Western visitors to Draculaland.

"The real Dracula fought for the cause of the Romanian people," an official of the government tourist agency declared recently. This was so at variance with my earlier reading on the life and times of Vlad Tepes, "Vlad the Impaler," that I visited Andrei Raiescu, director of the Romanian National Tourist Office in New York. Mr. Raiescu, a prematurely graying young man, was candid in discussing Dracula as a tourist attraction. "In 1974, we expect to draw four million tourists. About 800,000 of these will come from Western countries—but only 30,000 from the United States." The implication was clear: Relatively few Americans visit Romania; Americans are in love with Dracula, therefore Dracula deserves promotion.

The author is in the Foreign Service. Mr. Battaglia photographed patent models in April, 1973.

The real Dracula was born in the old German fortress city of Schassburg in Transylvania. Authorities are uncertain of the birth date, but 1431 is a good guess. A plaque marks the house in which Dracula was born; it's dedicated to his father, Dracul.

Young Dracula's father was a strong man who became a prince of the southern Romanian principality of Wallachia. He was also the duke of two districts—Almas and Fagaras. Dracula's sense of his own importance was early enhanced when the entire family was baptized and made members for life of the Order of the Dragon—avowed foes of the hated Turks.

Dracul consolidated his already powerful position through trickery. Sensing that the balance of power was shifting to the wily Turkish sultan, Murad II, Dracul signed an alliance with the Turks—violating his sacred oath. Many Transylvanians surrendered to Dracul, pleading for mercy; the alternative was to be carried away by the Turks.

Dracul's "mercy" to his own kind in turn aroused the sultan's suspicions. He invited Dracul and his sons

across the Danube for a meeting in the summer of 1444, there to accuse Dracul of treachery. Dracul prostrated himself before the sultan, promised eternal loyalty—and left Dracula and his brother, Radu, in Turkey as hostages, where they saw at firsthand murder, rape and looting.

It was an egg-treading existence for the teen-aged Dracula, who lived at Turkish sufferance. But he seemed to thrive on adversity, learned the language and gained insight into the "tortuous workings of the impressionable Turkish mind." Upon his escape in 1448, he had a reputation for treachery, pugnaciousness and brutality.

Dracula had perhaps been goaded to escape when he learned of the murder of his father a year earlier. It seems likely that the Turks looked the other way when their strapping prisoner made his way to freedom, for they put him on the Wallachian throne that year—a move that lasted only a couple of months.

It failed because Dracula fled his throne for very good reasons. He trusted nobody, was surrounded by his father's murderers and didn't want to go back to the Turks. So he chose Moldavia, the northern Romanian principality, and exile. Later, he surfaced again in Transylvania, where he threw himself upon the mercy of the powerful prince who had been responsible for the murder of his father.

Murder and pillage had become a way of life for Dracula, and he indiscriminately fought friend and foe. In German, Russian, Hungarian and Italian, the deeds of this deranged and cruel prince are copiously recorded. Nothing in the record ties him to vampirism, but Dracula—"Vlad the Impaler"—was bloodthirsty to the point of extreme sadism. It is hard to find in the record of his career anything to justify a heroic image.

A few reported examples:

In order to terrify his Turkish neighbors, whose plans to invade were widely rumored, Dracula speared Turks with his own hands and impaled parts of their bodies on stakes in a gory skirmish line at the border.

Once, offended by the presence of beggars, Dracula summoned them to a lavish banquet. After they had eaten their fill, he inquired if they might like to be freed forever from the cares and worries of fending for themselves. When the beggars chorused a grateful "yes," Dracula had the entire dining area boarded up and set afire.

When a group of Turkish envoys declined to remove their turbans in his presence, Dracula inquired why they so affronted him. Told that they only followed Turkish custom, Dracula replied: "I too wish to strengthen your law." With that he called in his guards and had the turbans nailed to the Turks' skulls.

This icon of Dracula may be only existing authentic portrait of the 15th-century figure.

The delights of impalement

Impalement was hardly a new method of torture, but it was Dracula's favorite means of imposing a death sentence. A horse was usually harnessed to each leg of the victim, while a stake was carefully introduced to hold the body firmly in place. Sometimes the torturers got specific instructions from Dracula to refrain from making the stake too sharp, lest a quick, gaping wound kill instantly. Dracula often dined outdoors amid the screams of his impaled victims, hung up on stakes around the dinner table. On one occasion, a guest complained of the stench of the dead and noise of the dying. At once, Dracula had the poor fellow impaled on a stake much taller than the others, in order to let him die out of range of the odors!

There was another side to Dracula's personality. It's not enough to dismiss him as a torturing, demented scoundrel, whose very name means "son of the Devil" in Romanian. True, he was all of that, but he was also dealing with other murderers and intriguers—"foreigners" who were either trying to overrun his country

or perpetuate their monopoly of trade in the Romanian principalities. Life was both cheap and short.

In 1476, Dracula fought his last battle outside Bucharest. It is not certain how he met his death. It is both grisly and appropriate that this mass murderer's head was severed, sent to the sultan in Constantinople and displayed—on a stake—for all to see.

What then of Stoker's Dracula, the legendary vampire brought to life on the screen by Bela Lugosi? Stoker himself wrote of his own painstaking efforts to consult established authorities and to study the available literature of the embattled lands fought over by Christians and Turks. His geography was never far off the mark: The town of Bistrita is precisely described and located; so are other villages in the tale; the Borgo Pass leading from Transylvania to Moldavia really exists and is beautifully described in Stoker's novel.

Stoker departed from the truth in embellishing Dracula's character—especially by making him a vampire. He also fictionalized Castle Dracula, a strange mausoleum somewhere in the Transylvanian mountains. Yet there exist, eerily, high up in those mountains, the twisted spires and battlements of Dracula's *real* castle. It's now under the protective custody of the Romanian government and is being renovated.

Other Dracula castles are emerging from the limbo of the Middle Ages to be spruced up in support of both legend and truth. Dracula's palace at Tîrgoviste is an impressive structure; his tomb at Snagov (the body was missing when the tomb was excavated in 1931) is already famous. So is Bran Castle—and Brasov, said to be the site of one of his famous massacres.

Stoker himself, through the medium of his hero, Jonathan Harker, was of two minds about Dracula. Harker's first impression—an extension of Stoker's view of the monster he was creating on paper—was this: "His face was a strong—a very strong—aquiline, with high bridge of the thin nose and peculiarly arched nostrils; with lofty domed forehead, and hair growing scantily round the temples but profusely elsewhere. His eyebrows were massive, almost meeting over the nose, and with bushy hair that seemed to curl in its own profusion. The mouth, so far as I could see it under the heavy moustache, was fixed and rather cruel-looking, with peculiarly sharp white teeth. . . ."

Later, when Harker comes upon Dracula in his coffin, the reaction is different: "There lay the Count, but looking as if his youth had been half renewed, for the white hair and moustache were changed to dark iron-grey; the cheeks were fuller, and the white skin seemed ruby-red underneath; the mouth was redder than ever, for on the lips were gouts of fresh blood, which trickled from the corners of the mouth and ran over the chin and neck. Even the deep, burning eyes seemed set amongst swollen flesh, for the lids and pouches underneath were bloated. . . . The whole awful creature [was] simply gorged with blood. He lay like a filthy leech, exhausted with his repletion."

Authentic villain or legendary vampire, Count Dracula is alive and well.

Woodcut shows Dracula dining amid impaled victims while others are hacked up for his delectation.

At eerie Snagov Castle, Dracula was buried—minus his head. By 1931 his body had vanished.

This so-called "mourning sword," a black-hilted small sword, is on exhibit at Mount Vernon.

Washington's "great battle sword" is really a hunting sword. The General could have worn it

First President's variety of swords

George Washington's wardrobe was crammed with blades, but which one of them did he select to wear at his first inaugural in 1789?

By Patricia Coffin

The late Patricia Coffin, poet and author, was formerly a senior editor at Look *and then a consultant to* Life *on special projects.*

As the 200th anniversary of the signing of the Declaration of Independence looms, Americans are forming Bicentennial committees and brushing up on their Revolutionary history. Yet there are still nebulous areas in the record of George Washington, despite some fine biographies of the star of our Revolutionary drama. What, for example, became of the sword Washington wore at his first inaugural?

The U.S. Bicentennial Society of Richmond, a private group, asked my husband, Merrill Lindsay, an arms historian, to authenticate certain arms from the early history of the United States. The Society was interested in John Paul Jones' saber, the pistols used in the duel between Aaron Burr and Alexander Hamilton, the Washington pistols at West Point, and Washington's inaugural sword. In trying to document that last item, my husband was led on a chase.

Washington was a sword collector. Though generals in his day no longer expected to lead cavalry charges with sabers drawn or to fight duels with rapiers, the wearing of a dress sword was a symbol of authority, and George Washington took protocol seriously. He owned at least a dozen swords, including one that had belonged to the British general, Edward Braddock, who had been Washington's commanding officer on the disastrous 1755 expedition against the French at Fort Duquesne. Nine of Washington's swords survive in museums and private collections.

In his will, the General bequeathed a sword each to

during the Revolution. It went to his only military nephew and is now in the Smithsonian.

This hunting sword, or "hanger," with lion's head pommel and a guard chain, is privately owned.

five of his nephews. The claim is made for two that each is the sword Washington wore at his first inauguration. General Washington wore only one sword, at his left side, when he took the first oath of office as President.

One of the swords in question was a gift to Mount Vernon from J.P. Morgan. Called the "state sword," it has traditionally been identified as the one worn both when Washington resigned his commission in 1783 and when he was inaugurated in 1789.

This sword has also been identified with the one in a Charles Willson Peale painting done in 1772 which depicts Washington as a youthful officer of his Virginia regiment (p. 118). The painting now belongs to Washington and Lee University.

But after consultation with other arms experts, Merrill Lindsay recommended that the U.S. Bicentennial Society choose for reproduction the silver-hilted sword which belongs to the museum at Morristown, New Jersey, where Washington had his headquarters in the winter of 1779-1780. My husband feels that this Washington sword is the best documented and authenticated of all the surviving Washington possessions and is the one Washington was most likely to have worn at his inauguration.

Before the former President died in 1799, he presented this sword to his eldest nephew and it remained in the family, passing from father to son, until after the death of Dr. Lawrence A. Washington in 1882.

In 1889 Dr. Washington's widow sold this sword to the Washington Association of New Jersey for display at the Morristown Washington Headquarters Museum, where it has remained. With it went a pair of silver knee buckles, one silver shoe buckle, a coat, waistcoat and smallclothes, all of which, according to family tradition, Washington wore at his inauguration. These are now on display at Federal Hall in New York city, on the site of the first inaugural. "Smallclothes," by the way, was a name for close-fitting breeches favored especially by ladies who felt it would be indelicate to mention by name such an intimate article of a gentleman's attire.

To describe the sword, I will quote and try to interpret my husband: "It has a solid silver boatshell and knuckle guard, pommel, pas-d'ane and quillons. The grip is silver wire wound over a wooden mandrel [handle]." The layman can visualize the boatshell guard and the part that protects the knuckles. The pommel is the ball at the hilt end of the sword; the pas-d'ane is a vestigial and purely decorative remnant of what used to be finger guards in the larger, heavier swords of previous generations; and quillons are vestigial descendants of the original cross guard.

"The Morristown sword is typical of officers' swords in the last third of the 18th century. It has a flattened hexagonal colichemarde blade—wide at the forte for strength against a blow, light and narrow in the foible for ease of thrusting." A colichemarde blade is thick

at the root, or forte, and slender in the foible (from the French word, now *faible*) or main part of the blade. Washington seems to have favored this shape as several of his surviving swords have similar blades. The Morristown blade is 34¾ inches long and was etched at the forte with a design, which was blued and gilded.

Merrill asked the London Goldsmiths' Company to identify the maker of the hilt which bore the stamp "J.P." London replied that the maker was James Perry, who worked from 1767 to 1777 at number 10 Crown Court, Fleet Street, and listed himself with the Goldsmiths' Company as a sword hilt maker. The date stamp on the *entorsade* (swirled grooves) hilt is for the year 1769-1770. Because of the Revolutionary War it must have come to America before 1775.

The Morristown sword is said to have been given to Washington by his old friend and fellow Virginian, General William Darke (1736-1801), who served with Washington in the Braddock campaign and during the Revolution. "A romantic account of the sword being used to kill Indians is undoubtedly apocryphal, although Darke did serve under General Saint Clair in the campaign against the Miami Indians," adds Merrill. Apocryphal because a dress sword is an unlikely weapon to use for tackling Indians.

"At the risk of having all of George Washington's collateral descendants haunt me nightly," says Merrill, "I can find no surviving sword which remotely fits the description of a small sword of '8 or 10 Guins. price' which Washington asked his London agent to buy for him in 1756," a year after he was made a Colonel. The search for it involved the examination of swords at Mount Vernon, a fire-damaged sword in the New York State Library in Albany, one in the Smithsonian, and one in the collection of Dr. John Lattimer of Columbia University.

One of the swords now at Mount Vernon came from a German admirer of Washington who apparently entrusted his son to deliver the gift. It has a stirrup guard and backstrap of gilt brass, and a grip of leather wound with copper wire. Etched along its blade is a long dedication in German which translates: "DESTROYER OF DESPOTISM, PROTECTOR OF FREEDOM, STEADFAST MAN, TAKE FROM MY SON'S HAND THIS SWORD, I PRAY THEE. THEOPHILUS ALTE AT SOLIGEN." Theophilus' son must have been an irresponsible member of the younger generation, for the sword was left as a pledge with a tavern keeper near Alexandria. Meanwhile Washington, who had heard that the sword was on its way to him, wrote our Ambassador to the Netherlands, John Quincy Adams, inquiring about the maker. One Joseph Vanmeter bought the sword from the tavern keeper for $35, presumably on impulse, for he wrote the General that he did not know of the inscription to Washington until he got it home. Vanmeter sent the

Hunting sword made in Germany and bearing a long German inscription is now at Mount Vernon.

Also at Mount Vernon is this older sword, probably given to Washington by General Braddock.

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The Mount Vernon dress sword had the first claim as having been worn at the 1789 inaugural.

More likely inaugural sword, presented to eldest nephew, now hangs at Morristown's museum.

sword to Washington and wrote the General what he had paid for it. There is no record of whether or not Washington reimbursed him.

The Morristown sword, chosen for reproduction by the U.S. Bicentennial Society to symbolize the Revolution and the life of Washington, has the best claim to have been Washington's favorite sword and the side arm he wore when he became President. It was the only one of his prized swords that he gave away before he died, and he presented it to his eldest nephew, who, since Washington had no son, was his nearest male relative. Merrill says, "We must reject other less substantiable claims or we will wind up with as many Washington inaugural swords as there are beds the General slept in."

In giving one of his swords to each of his nephews, George Washington's will adds an injunction that perhaps helps explain the importance the General attached to them. He enjoins his nephews "not to unsheath them for the purpose of shedding blood except it be for self defence, or in the defence of their Country and its rights; and in the latter case, to keep them unsheathed, and prefer falling with them in their hands to the relinquishment thereof."

Sword in Charles Willson Peale portrait cannot be identified with any known sword. Arms historian Merrill Lindsay, right, inspects replica of Morristown sword, made by Britain's Wilkinson Sword Ltd.

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Book reviews

Voices for Life: Reflections on the Human Condition
Edited by Dom Moraes
(Praeger, $8.95)

Technology and the Frontiers of Knowledge. Volume I, *Frank Nelson Doubleday Lecture Series at the Smithsonian Institution*. Talks by Saul Bellow, Daniel Bell, Edmundo O'Gorman, Sir Peter Medawar and Arthur C. Clarke.
(Doubleday, $6)

When the impoverished and lonely Pip returned home from his first visit to Miss Havisham's mansion in *Great Expectations*, he felt compelled to lie about what he saw there. Among other things, Pip fabricated four immense dogs—"they fought for veal cutlets out of a silver basket." A whopper. Today, over a century later, the Peruvian anchovy catch—which alone could wipe out the entire protein deficiency of South America—is instead largely going to feed the pet population of North America.

In the face of this kind of reality, the U.N. Fund for Population Activities has put together a *Festschrift* in honor of being alive and kicking at the tail end of what is turning out to be a very tough century indeed. *Voices for Life*, edited by the Indian poet Dom Moraes, brings together an impressive collection of original essays and interviews with thinkers the world over.

Margaret Mead, Isaac Bashevis Singer and Indira Gandhi give glowing reminiscences of their coming of age. Lionel Tiger puts industrialized man in touch with the realization that in the rage for more efficient technology he has forgotten how to carve out a log canoe or to make simple clothing. Jonas Salk reminds us that we may very well be precariously balanced on the s-curve of population—like fruit flies in a bell jar or lemmings with a dank fjord in our future. And Heinrich Böll argues that to those time-honored building blocks of the cosmos—earth, air, fire and water—should be added two more: peace and quiet. And so it goes for these and the 19 other writers who contributed to this volume—Gloria Steinem, Julian Mitchell, R. Buckminster Fuller and Barbara Ward, to name a few.

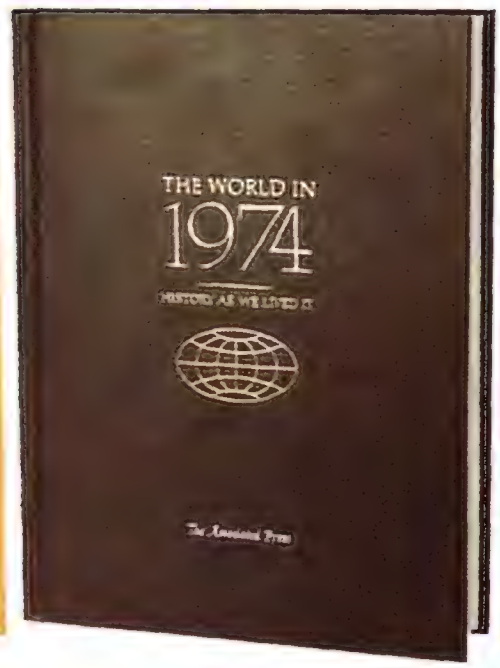
If there is one common note, however, it is this: To be alive for these people means to be constantly expanding one's awareness of himself and of his environment—people, places and things. The United Nations, or some other appropriate body, should immediately begin to establish a set of minimum daily requirements for awareness expansion. A certain number of units could then be given for feeling another's loss, understanding a neighbor's defenses or absorbing someone else's guilt. And full marks could be given as well for reading this fine book.

By contrast, *Technology and the Frontiers of Knowledge*, a series of lectures presented at the Smithsonian, is an old-fashioned donnybrook. At one end of the continuum that runs from the material to the spiritual stands Saul Bellow. He is incensed that the technocrats should consider art and mythmaking an atavistic holdover from a cruder, less sophisticated existence. For Bellow, modern devices are too often simply gimmicks that cheat and overawe the soul.

At the other end of the spectrum stands the entertaining and puckish Arthur C. Clarke, author of *2001: A Space Odyssey*. He responds (indirectly, of course) by adducing the Antikythera computer, an ancient Greek device for making astronomical calculations. As it happens, it coexisted with the great ages of epic poetry.

In between Clarke and Bellow stand a number of other writers who call for a new technology based on ecology (as today's medicine is based on physiology), who see technology as a glass through which we view the past darkly, and who dictate on the role of technology in shaping society.

In the end, of course, there is no reason to believe that technology and art cannot live in peace and harmony together. Near Bombay, Clarke reports seeing a holy man



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who had but two possessions in this world: the first, a loincloth, the second, a solid-state bullhorn—the better to punch his message across the gulf from the physical to the spiritual.
—Michael Olmert
Free-lance writer and critic

Stanley: An Adventurer Explored
Richard Hall
(Houghton Mifflin, $12.50)

Queen Victoria described Henry Morton Stanley as "a determined, ugly little man —with a strong American twang." In his early days of fame he was viewed by the British establishment as a brash and nasty example of the new journalism and, in the words of one British officer, "a howling cad."

Born in a small town in North Wales with "bastard" inscribed next to his name on the church register, Stanley was brought up in a workhouse but ended his days with a knighthood and a memorial service in Westminster Abbey. But his reputation as a brutal conquistador has survived, and he has ever since been compared unfavorably with the man who was his hero, David Livingstone.

The popular view of Livingstone, the gentle missionary explorer with a Bible in his hand, has now undergone a reappraisal, and recent biographies, disclose a distinctly arrogant and devious side to his nature. Richard Hall's outstanding book, with much newly researched material, reveals a more sympathetic and human side to Stanley than had been suspected. Stanley emerges as an extremely complex character—scoundrel, adventurer, idealist—and a deeply vulnerable person who often resorted to bravado to conceal his "base origins."

This biography appears 100 years after Stanley began his greatest exploration, the "filling in of Africa's blank space," a horrific three-year journey across the continent from the Indian Ocean to the mouth of the Congo River.

Stanley's incredible achievement led to the "scramble" for Africa—the carving up of the continent by the European powers. It also set the stage for his own role in founding King Leopold's grisly Congo Free State, and the atrocities and cruelties committed there by "administrators" haunted Stanley's last years.

To escape a wretched, impoverished life in Britain, Stanley at 17 shipped to

New Orleans, where he was adopted by a cotton broker whose name he took. He served as a Confederate soldier; later, changing sides, he joined and deserted from the Federal Navy, and once returned to his hometown in North Wales wearing a make-believe officer's uniform.

He went on to report an American Indian war and later covered a British military campaign in Abyssinia, scooping all his colleagues by smuggling his story ashore while he and the British officer who carried the dispatches of other correspondents waited out a quarantine on board a ship in the Suez Canal. His "scoop of the century," however, was finding Livingstone in an expedition sponsored by the *New York Herald*. (The *Herald* and *Daily Telegraph* of London jointly sponsored Stanley's second trip to Africa.)

Stanley, the bold explorer, was the shyest of men in his relations with women. He once wrote to a friend after a month's courtship, "If I have to propose to her, do you know I rather think I will not have the courage. And then there is a mother in the case, and I am afraid of her. I think it would be a boon to shy people like myself, if there were no such people as mothers."

One of the fascinating discoveries in Richard Hall's biography is that Stanley was secretly engaged to 17-year-old New York heiress Alice Pike when he set out for his journey across Africa. They signed a marriage pact before he left, but when Stanley finally staggered out of the Congo he learned that his fiancée had married a Mr. Barney and already had a daughter.

Later, Alice Pike Barney became a playwright and painter and settled in Washington, D.C. The daughter Natalie went to live in Paris, where she maintained a famous salon and became one of the lovers of Colette.

—Richard Beeston
Washington correspondent,
London Daily Telegraph

The Appian Way,
Dora Jane Hamblin and
Mary Jane Grunsfeld
(Random House, $12.50)

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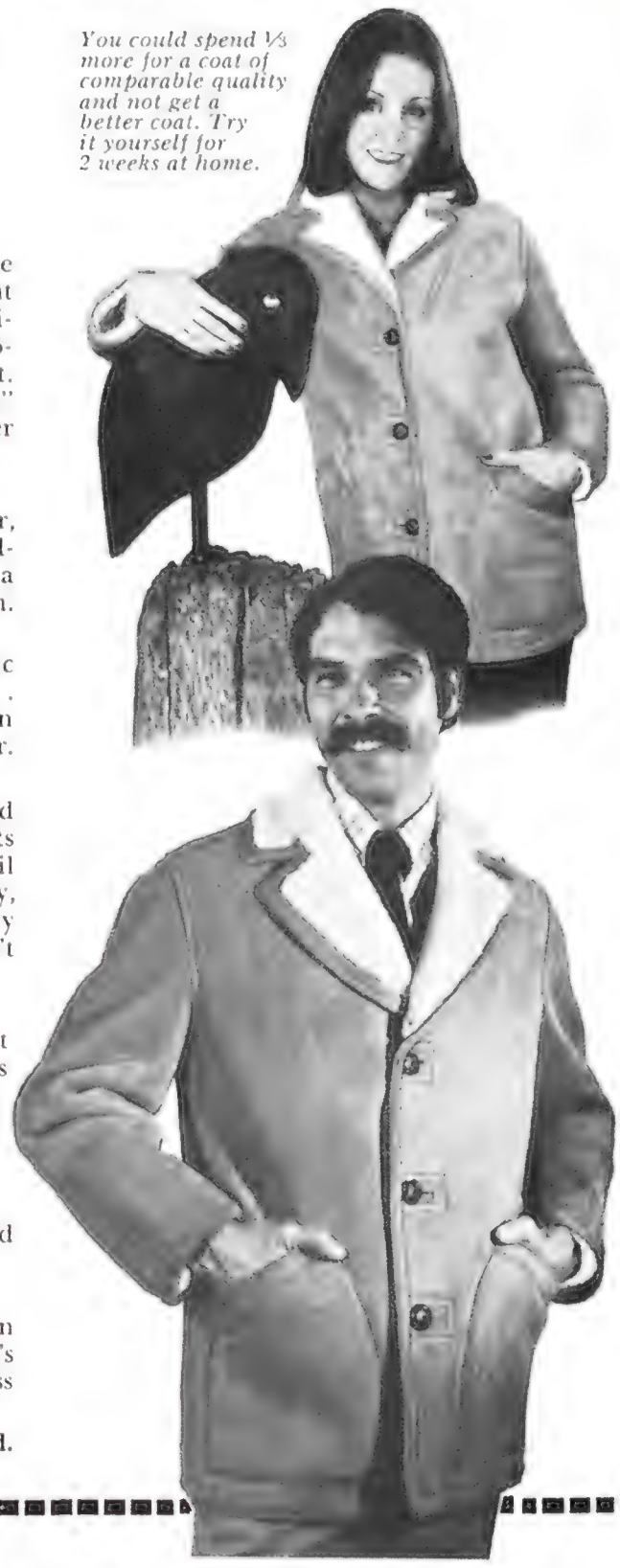

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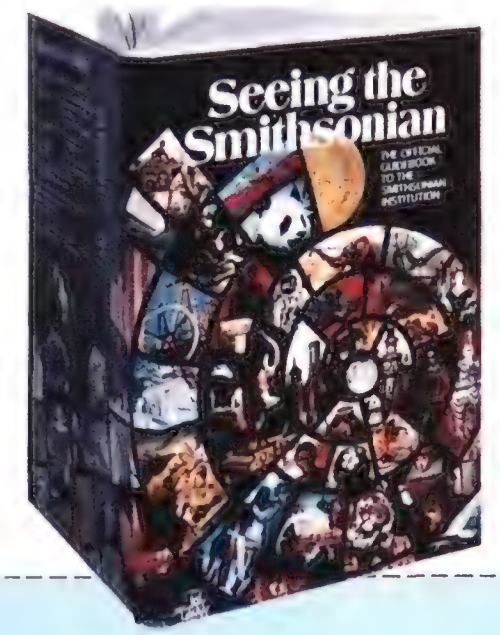

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The authors have collaborated on a book, thick with facts, that serves as both a guide to and a history of the Appia. In two years of mobile research, they drove their Fiat more than 4,000 miles over and around the Appia's 360-mile-route, and they hardly missed a monument, ruin, wall, or a legend or an anecdote. Along the way, they discuss archaeology, geology, etymology, engineering, literature, inns and food, sewers and fountains, tombs, maps, milestones, road maintenance, vehicles, Roman noise-abatement legislation, and much more. Next trip to Italy, with the aid of this book, you too can pick out the spot on a Pontine canal where Horace spent a miserable night on a barge in 38 B.C.

The authors have provided an exhaustive guide to the Appia, parking directions and traffic tips included, for ruin lovers, road lovers.

Sadly, they advise travelers to see Italy while it's still there. Their book is an indictment of the destructive neglect by the Italian government of some of the world's finest cultural and historical monuments. "The lovely land of Italy could succumb, finally and irrevocably, to the automobile, to speculative building, to human greed and indifference," the authors say. More damage has been done in a few decades than centuries of misuse could cause. Abandoned archaeological diggings became garbage dumps. Every effort to establish an Appian park near Rome is foiled by speculators and bureaucrats.

History is apparently expendable in a country so full of it. It is difficult for a country to be an open-air museum and keep pace with the 20th century at the same time, and it is also expensive.

The authors ask if the past has a future. The verdict, even for Appian antiquities, has still to be pronounced, but pessimism is a realistic attitude to assume while we wait. Pius II was shocked by damage done to Rome in the 15th century, and he

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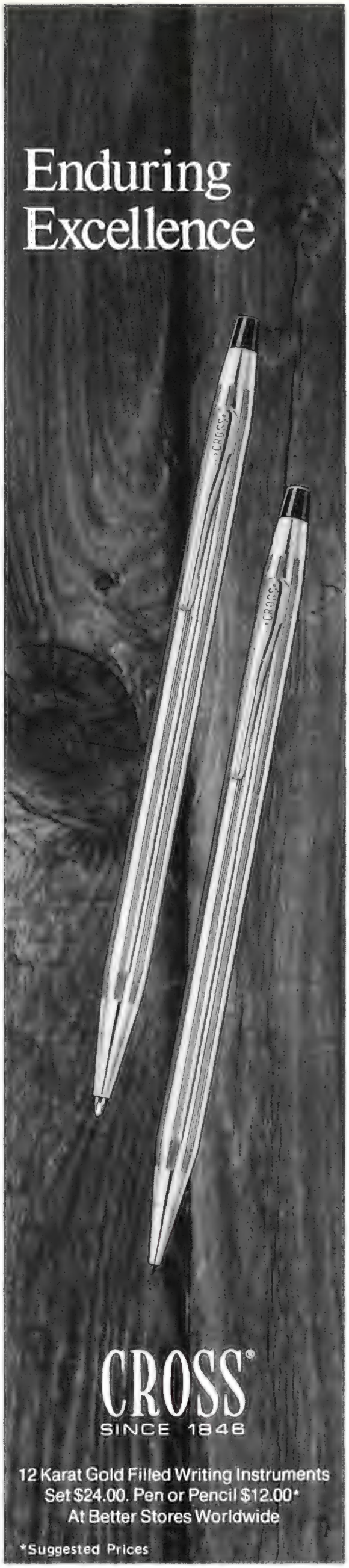

predicted that "If this sacrilegious people continues thus for 300 years more, there will remain no vestige of greatness." He undershot the mark, but probably not by much. What hopes were entertained for the past's future when this book was completed must seem appreciably dimmer a year later.

—*Robert Rinehart*
Historian and specialist in medieval and Renaissance studies

The World of George Washington
Richard M. Ketchum
(American Heritage, $35)

Here is a major Bicentennial effort by the publishing complex which, more than any other in this country, owns American history. Inevitably, American Heritage's *George Washington* reveals no new, long-concealed juiciness, nor attempts to supplant the work of Douglas Southall Freeman as the definitive word. It contents itself with being merely the richest, most lavishly illustrated, most carefully yet entertainingly written exposition of our national father figure yet produced: a beautiful and professional keepsake book. Those whose fingers tire easily should bear in mind that it measures 11 by 14 inches in its boxed edition and weighs five pounds.

Definitive the text may not be, but it brings out a number of facts that have managed to elude most of us during our 200-odd-year canonization of our first national leader. There is the fact that John Washington, the first of the family to land in Virginia, settled there by accident, after the vessel he served on as mate sank off the coast. And did you know that this John's clerical father was booted out of his English parish because he was "a common frequenter of ale houses?" And what about the fact that John's second wife had once been accused (slanderously, Ketchum hastily adds) of running a bawdy house? No, neither she, nor John's *third* wife—labeled the governor's mistress by the same source of gossip—had anything to do with George's genetics, but John's life indicates that the great-grandson might have inherited a fair bit of seltzer in his bloodstream.

Some other facts about George's life are neatly emphasized. In his eight years as Commander in Chief of the American forces in the Revolution, he faced the British in battle only ten times—and lost

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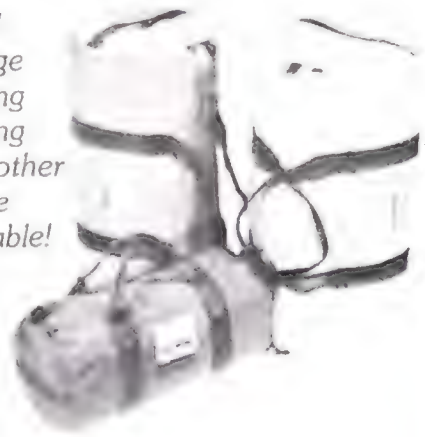

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(often just barely) almost every battle but the last, at Yorktown. Yet he can only be judged, even by today's sophisticated historians, an excellent general because he managed to maintain a fighting force at all, given the conditions.

Washington's bookplate and coat of arms

Another item emerges when the General heeds his nation's call to the Presidency. He did not want it, certainly, but how alluring was the clean slate on which he could help mark the path of the new nation. And so, even before the Electoral College had verified his election as President, Washington wrote a 73-page inaugural address, which was never delivered and was later, oddly, suppressed. Ketchum notes that it gives a remarkable view of what Washington considered the national destiny. "Above all he wanted the government to function in a spirit of unanimity, without philosophical or sectional differences to mar it. He envisioned a strong and healthy economy, the encouragement of American manufactures, regulation by Congress of coinage and currency and a system of weights and measures, and support by that body of improved 'education and manners of a people' as well as the arts, science, invention, and 'institutions favorable to humanity'. . . . In those who would serve the new government as officials, he desired 'rectitude' above all else."

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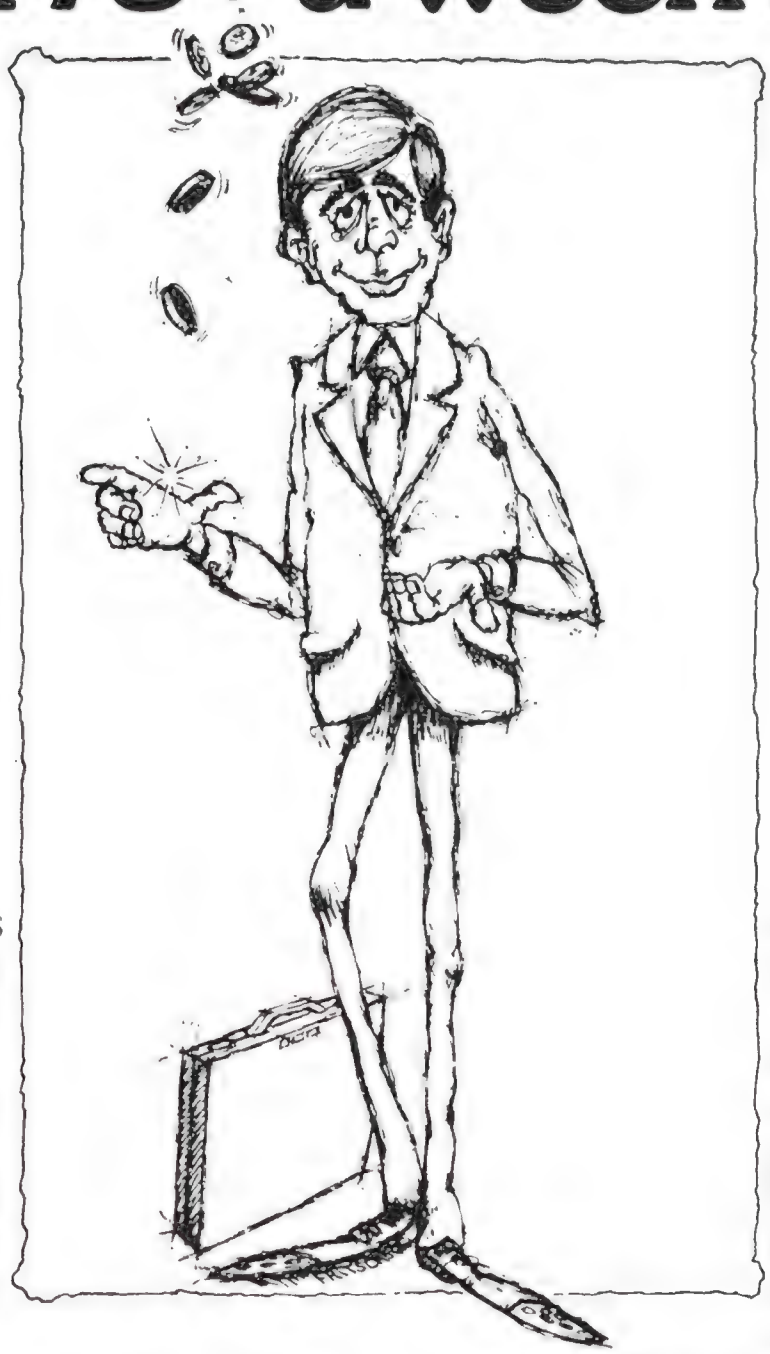

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A sumptuous setting for treasures of Chinese archaeology

The great exhibition of recent archaeological finds from the People's Republic of China, which SMITHSONIAN showed in September 1973, is now at the National Gallery of Art in Washington after being seen in Paris, London, Vienna, Stockholm and Toronto.

The 385 objects were all unearthed during the last 25 years; all are of archaeological interest and most

are of surpassing beauty, such as the famous bronze "flying horse." The National Gallery's installation, designed by Gaillard Ravenel and George Sexton, is a model of restrained elegance and lucidity; it is arranged chronologically, beginning with relics of primitive man from 600,000 years ago and ending with some exquisite silver toilet articles of the 14th century A.D. The room above is one of three filled with objects from the Tang dynasty (A.D. 618-907); the three-colored pottery horse at the right is 32 inches high.

After the exhibition closes at the National Gallery on March 30, there will be only one other opportunity to see it—at the Nelson Gallery-Atkins Museum in Kansas City, April 20 to June 8. Then, back to China.

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Smithsonian highlights

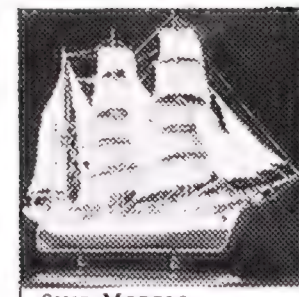
National Collection of Fine Arts

"American Art in the Barbizon Mood" is a major exhibition featuring landscape and genre paintings by American artists of the late-19th century who were influenced by the French Barbizon School. Ninety-four paintings and 17 prints by 44 Americans comprise the major portion of the show. Also included are the works of nine French artists of the Barbizon group—through April.

Puppet Theater,
Arts and Industries Building

Robert Louis Stevenson's *Treasure Island* is the new show presented by Allan Stevens & Company. The ever popular tale opens February 5. Performance times are Wednesday, Thursday and Friday at 10:30 and 11:30 A.M., Saturday and Sunday at 10:30, 11:30 A.M. and 1:30 P.M. For ticket information and group reservations, call 381-5395. Children under three excluded.

Allan Stevens creating Blind Pew, one of the pirates in *Treasure Island.*



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The fourth annual musical weekend, featuring concerts in settings from the Opera House of the Kennedy Center to the Sculpture Garden of the new Hirshhorn Museum, will be held May 2-4. Included in the weekend are tours of Smithsonian museums and galleries, private dinners in Georgetown houses and the historic Smithsonian Castle, and a reception at one of the capital city's elegant embassies. A concert played on authentic, antique instruments from the Smithsonian's collection is a special event of this year's weekend. A limited number of reservations are available. Write to Musical Weekend, Museum of History and Technology, Room 4123, Smithsonian Institution, Washington, D.C. 20560.

Divisions of Performing Arts and Musical Instruments

The Music from Marlboro Series presents a concert of selections from Haydn and Mozart—February 1, 5:30 P.M. Baird Auditorium, Museum of Natural History.

Budd Johnson, a composer and concert saxophonist, is featured in the Jazz Connoisseur Series—February 2, 5:30 P.M., Hall of Musical Instruments, Museum of History and Technology.

Morton Subotnick, playing his new electronic work, "Four Butterflies," for the first time on the East Coast, performs in the Hirshhorn Series—February 2, 6 P.M., Hirshhorn Auditorium.

The Jazz Heritage Series introduces trumpeter Clark Terry—February 9, 8 P.M., Baird Auditorium.

The featured work of the Theater Chamber Players' concert is Stravinsky's *L'Histoire du Soldat*—February 24, 8:30 P.M., Baird Auditorium.

For tickets and information about discounts for Resident Associates, senior citizens and students, call (202) 381-5395.

Winter Museum Hours

The Smithsonian museum buildings are open daily from 10 A.M. to 5:30 P.M. Hours for the National Zoological Park are 9 A.M. to 4:30 P.M. daily. For general information, call (202) 381-6264.

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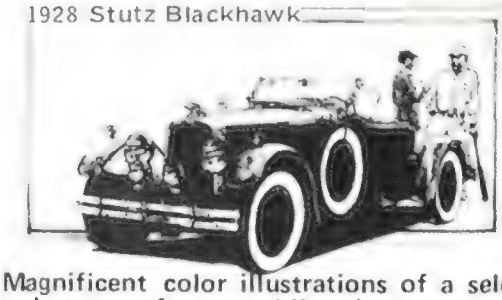

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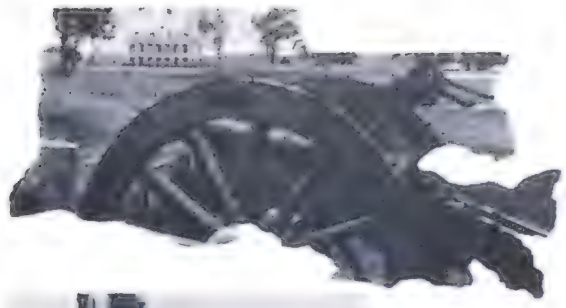

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National Portrait Gallery

"Saint-Mémin Engravings" is an exhibition of the historical collection of 761 portraits given to the National Portrait Gallery by Mr. and Mrs. Paul Mellon. The extraordinary works of art were drawn from life and engraved between 1796 and 1814 when Saint-Mémin lived in the United States. Among the subjects are Thomas Jefferson, John Marshall, Mother Seton, James Madison, Meriwether Lewis and Charles Willson Peale. The portraits will be displayed permanently in a newly opened first-floor gallery. Free guided tours are conducted between 10 A.M. and 3 P.M.

The first exhibition in the new gallery of the Archives of American Art will remain on view through September 1975. The exhibition, on the first floor of the National Portrait Gallery, commemorates the 20th anniversary of the Archives of American Art and is the first in a series of shows to be selected from the vast collections of letters, documents, sketchbooks and photographs of 29 artists of the 18th, 19th and 20th centuries.

Resident Associates' Events

A two-day seminar, "China: A Look into the Past," examines China's major historic and artistic periods. Dr. Franz Michel, Professor of International Affairs and Far Eastern History at George Washington University, leads the seminars, using the National Gallery's exhibition of Chinese archaeological treasures and the collection of the Smithsonian's Freer Gallery as starting points for the discussions—February 24-25, 10 A.M. to 4 P.M. For information, call (202) 381-5157.

Museum of History and Technology

"Mr. Audubon and Mr. Bien" is an exhibit of John James Audubon's *Birds of America* illustrations, transferred from the French engravings by American lith-

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The 1975 Directory is now off the press and yours for the asking. It lists 34 nature tours within the U.S., Canada, Mexico, South and Central America, Asia, Africa, and Oceania and Australasia.

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Foreign Study Tours

The African Quest—February 14-March 25: Board the MTS *Apollo* at Dar es Salaam; circumnavigate Africa to Dakar; cruise up the Congo River • **Australia and New Zealand**—March 14-April 8: Flora, fauna and anthropology, via Tahiti and Fiji • **Northern Spain and Southern France**—May 13-June 4: Cave paintings and the art of Paleolithic man • **Classical Greece**—June 10-July 2: Archaeological sites in central Greece and the Peloponnesus • **Copenhagen to Lisbon**—August 23-September 14: Art and architecture cruise aboard the *Argonaut* to celebrate "European Architectural Heritage Year"; stops at major European ports • **Russia**—September 20-October 4: Art and architecture • **Hawaiian Islands**—November 8-21: Petroglyphs and natural history • Write Miss Bliss Schumann, Foreign Study Tours, SI 123, Smithsonian Institution, Washington, D.C. 20560.

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Great Britain—May 1-15 or September 25-October 9: The National Gallery, Tate, Victoria and Albert; walking tours of literary London and springtime excursions into the countryside; the best of London theater and performing arts • **Russia**—May 8-22, May 21-June 4, October 2-16 or October 16-30: The Bolshoi Ballet, Moscow Circus, Hermitage and schools, factories and hospitals in Moscow, Leningrad and Riga, accompanied by skilled guides and interpreters • Low cost of tours includes first-class hotels, most meals (full board in Russia), sightseeing, lectures, theater performances and round-trip air fare from New York • Open to members of Smithsonian Associates only • Write Robert Angle, 900 Jefferson Drive, Smithsonian Institution, Washington, D.C. 20560.

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• **Smithsonian Fine Arts Weekend**—March 7-9: An intensive visit with curators of Smithsonian art museums, including the Hirshhorn Museum and Sculpture Garden • **Georgia Burial Mounds**—March 19-25: Exploration of prehistoric cultures discovered at archaeological digs and burial mounds • **Death Valley**—April 5-13: Camping under desert skies and study of the fascinating geology of this national monument; expeditions in four-wheel-drive dune buggies • **Pre-Civil War Mississippi**—April 13-20: Visit the Governor's mansion and attend a reception in the rotunda of the old capitol building in Jackson; meet with local historians and owners of antebellum houses in Vicksburg, Port Gibson and Natchez; enjoy the spectacular Southern formal gardens • **Arizona**—May 3-12: Hopi and Navajo cultures, past and present; cliff dwellings and the scenic beauty of Grand Canyon and Canyon de Chelly • **Philadelphia**—May 14-18: The charm of Rittenhouse Square, Fairmount Park and Germantown • **Lincoln Heritage Trail**—June 7-14: Trace the history of the Lincoln family from Lexington, Kentucky, to Springfield, Illinois • **Quebec**—June 21-28: French culture in Montreal and Quebec City • **Williamsburg**—June 27-29: A weekend planned especially for families with children of elementary school age • **Washington "Anytime" Weekend:** Choose any weekend to visit the nation's capital and enjoy a special tour of the Smithsonian Institution, two nights at the elegant Loew's L'Enfant Plaza Hotel, close by, and a chance to see other sites in Washington (all-inclusive price is $59.95 per person based on double occupancy) • Write Domestic Study Tours, SI 106, Smithsonian Institution, Washington, D.C. 20560.

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- San Diego, California—"Just Before the War" (San Diego State College, February 15-March 16).
- Tallahassee, Florida—"Manuscripts of the American Revolution" (Tallahassee Junior Museum, January 25-February 23).
- Chicago, Illinois—"The Black Presence in the Era of the American Revolution, 1770-1800" (Museum of Science and Industry, January 25-February 23).
- Fort Wayne, Indiana—"Delacroix and the French Romantic Print" (Fort Wayne Museum of Art, February 1-March 2).
- Duluth, Minnesota—"The Five Sense Store" (Area Cultural Center Corporation, February 1-March 16).
- Austin, Texas—"Chinese Export Porcelain" (University Art Museum, January 25-March 2).
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Located in the original Smithsonian Castle building, the Commons offers a new luncheon menu with individual service for a fixed price of $3.25. Hours are 11:15 A.M. to 2:15 P.M., Monday through Friday. An Associates card is required.

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Metro construction has made parking on the Mall near the Smithsonian complex extremely difficult. All parking prior to 10 A.M. is restricted. The use of public transportation is recommended. Write Associates' Reception Center, Smithsonian Institution, Washington, D.C. 20560, regarding fringe parking locations and public transportation.

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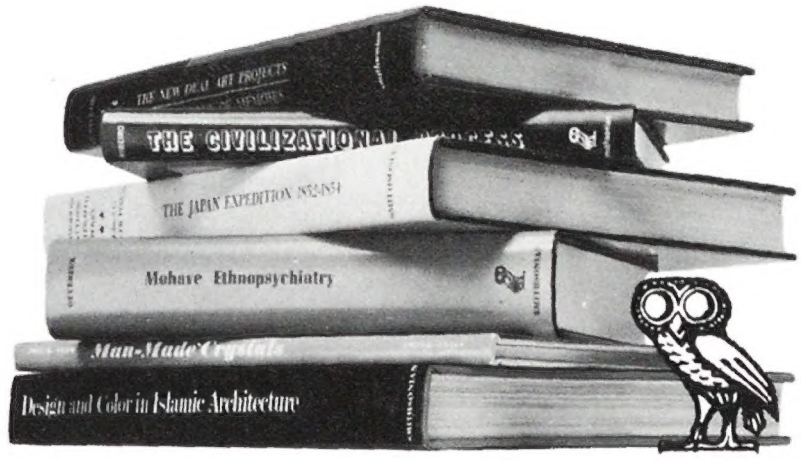

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By Patrick Ryan

Will you kindly applaud with one hand only?

Taking his prices from a Swiss proverb, Thomas Carlyle wrote in 1834 that speech is silvern but silence is golden. Had the canny philosopher been living now, he would likely have gone beyond the gold standard and pitched his price for a portion of quiet nearer to that of a hundredweight of uranium. Our Western public worlds today are so dominated by cloth-eared noisemongers and rock-deafened youth that silence has become a precious luxury. In our transistor-haunted and amplifier-persecuted societies, there is no escape from the brain-rotting din of the disc jockey or the mindless drone of Muzak.

Additional decibels are even emanating from historically reliable aphonic havens, as exemplified in Britain where the second Earl of Leicester sat in the House of Lords for 67 years and never addressed a word to that august body. The succeeding third Earl kept up the family tradition for another 32 years of parliamentary silence. But in 1962 the present Earl succumbed to the common urge for unceasing sonority and, after a mere 22 silent years, stood up and made his maiden speech. He was not asked, when he finished his initial oration, whether its reception added any substance to Abraham Lincoln's suggestion that it is better to remain silent and be thought a fool than to speak out and remove all doubt.

But, happily, all is not lost for lovers of a little peace and quiet. In the battle for unoccupied ears, the clowns, mutely miming, are still on our side. Simon and Garfunkel vocally supported our cause by singing their soft praises to the sounds of silence. No less a dramatist than Samuel Beckett has done his bit for us by writing his wordless 30-second play called *Breath* in which the only visible character is a pile of miscellaneous rubbish which just lies on the stage for that period of time and says nothing.

Our captains of commerce may soon detect that silence could be a growth industry. The market for hush may be about to boom and may offer rich pickings for those who get in on the soundless ground floor. Listening booths in music stores could have every fifth shelter provide five minutes of utter silence on payment of a small fee.

Railroads might avert bankruptcy if a surcharge were made for seats in special silence compartments insulated from all external sound, accessible only to passengers who put up a $500 hush-money bond to be instantly forfeited if they utter a word. This development would not be as profitable in England as in America, since mutual ostracism is already *de rigueur* in British railway carriages, as confirmed by Heinrich Heine's traveling observation that silence is equivalent to conversation with an Englishman.

Taxicab companies could help themselves by running fleets of similarly protected vehicles distinguished by a roof sign depicting a pair of sealed lips as an indication that the drivers had been recruited from the ranks of would-be Trappist monks. Muzak operators could turn prettier pennies if they wired up all the buildings they melodiously invade with a switchbox on each floor where, by inserting appropriate coins in a slot, hush-fanciers could purchase varying periods of freedom from aural immersion in sonic syrup. Telephone authorities might also introduce, for suitable extra charges, telephones which ring or bleep silently to insure that nobody will answer the persecuting instrument, thus sparing the world the usually resultant torrent of hectic but bootless chatter. However, for the clamorous time being, some occasional refuge can be found by haunted quietists in that miniature world of peace which can be contrived by watching silent television.

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